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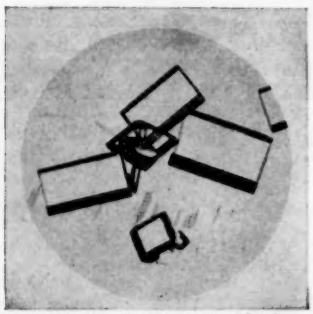

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By

JAMES MAXWELL, M.D. (Lond.), F.R.C.P. (Lond.)

Assistant Physician and Demonstrator of Practical Medicine, St. Bartholomew's Hospital; Physician, Royal Chest Hospital; Consulting Physician, Royal National Sanatorium, Bournemouth

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ADDRESSES AND ORIGINAL ARTICLES

DIABETES MELLITUS

A SURVEY OF CHANGES IN TREATMENT DURING THE LAST FIFTEEN YEARS*

BY GEORGE GRAHAM, M.D. Camb., F.R.C.P. Lond.
PHYSICIAN TO ST. BARTHOLOMEW'S HOSPITAL

I

IN considering the changes which have taken place in the treatment of diabetes mellitus since 1923 it is important to note the conditions in the previous twenty years when diabetes was a very serious disease. It was generally taught that patients did not live more than 2 years; but this idea was too pessimistic. One of my patients, now taking insulin, developed diabetes 13 years before the insulin era and is still alive and well 27 years after her first admission to hospital.

The diet advised before 1914 contained the minimum of carbohydrate (20–40 g.), over 100 g. of protein, and over 200 or even 300 g. of fat. It was the practice to give this diet to patients on admission to hospital and some of them passed into coma within a few days. Some workers therefore reduced the carbohydrate in slow stages, starting with 100 g. and eventually reaching 20 g., while continuing to give the same amounts of protein and fat as before. The results were better, but only the patients with mild forms of the disease ceased to pass sugar. The fasting régime of Guelpa, and the oatmeal and egg and vegetable diets of von Noorden helped some patients, but the great advance was made by F. M. Allen who demonstrated the benefits produced by under-nutrition. This form of dietetic treatment, which I worked out in ignorance of Allen's work, stopped the glycosuria and prolonged the lives of many patients. But it was very sad to watch them gradually losing strength and energy and eventually dying either in coma, or of some intercurrent disease after four or five years of ill health.

Banting and Best's discovery has improved the general health of diabetic patients out of all knowledge, though it has created problems still unsolved. We who look after diabetics know that insulin is of great value. The anti-vivisectionists hold it to be responsible for killing more patients with diabetes. The figures from the Registrar-General's report confirm the statement that more people now die of diabetes than formerly. The deaths attributed to diabetes in 1900 amounted to 1430 men and 1370 women, a total of 2800, and in 1935 to 2580 men and 4300 women, a total of 6800. Thus approximately 4000 more people died of diabetes in 1935 than in 1900. Many interesting points emerge (Fig. 1).

(1) The steady rise from 1900 to 1915 was followed by a striking drop during the war years. The same decrease occurred in Germany and was ascribed to lack of food, though I suspect that owing to the war the urines were not so carefully tested and the death certificates not so accurately filled up by the grossly overworked doctors who remained behind to look after the civilians.

(2) The number of women affected was nearly always less than that of men until 1918, but since then has always been greater and increasingly so each year, so that 2000 more women than men died in 1935.

(3) The introduction of insulin in 1923 would almost pass unnoticed by anyone studying these figures. The male deaths decreased slightly until 1927 but are now increasing, and the female deaths only showed a slight halt but are now increasing very rapidly.

The deaths from diabetes have increased in the same way in the United States: 22,500 died in 1930 and 26,850 in 1933.

After looking at this graph I do not wonder that the anti-vivisectionists make much of the apparent failure of insulin to check the rise in the number of deaths. The explanation, however, is given by the examination of the death-rate by decades. The figures for the first five years of life are so small that they are omitted.

Figs. 2 to 9 show that a significant decrease took place after 1923 in the number of deaths in the first four decades both in males and females; the figures for females are not so good as for males except

TABLE I—MORTALITY FROM DIABETES IN 1920–22 AND IN SUBSEQUENT YEARS

Standardised rates—	All ages.	0–55	55 and up.	0+	15–	25–	35–	45–	55–	65–	75 and up.
Death-rates per Million Living											
Males.											
1920–22	93·7	47·9	477·5	14	42	60	69	133	309	661	772
1931 ..	88·1	29·5	580·3	12	22	30	38	97	315	821	1161
1932 ..	92·4	28·9	625·6	10	21	30	45	93	320	897	1310
1933 ..	92·3	28·5	628·2	13	26	30	36	80	325	888	1326
1934 ..	91·0	27·2	627·0	10	22	27	32	94	331	889	1292
1935 ..	89·5	24·2	637·4	10	16	24	30	87	321	919	1344
Females.											
1920–22	90·1	43·1	483·9	16	35	48	62	124	355	656	632
1931 ..	110·9	33·4	762·0	11	26	31	45	121	473	1097	1218
1932 ..	111·4	32·5	783·3	13	20	29	46	118	485	1143	1219
1933 ..	114·3	33·5	793·0	12	25	30	48	118	470	1178	1275
1934 ..	114·9	30·7	821·4	10	18	28	44	123	490	1204	1344
1935 ..	117·0	30·4	844·3	9	21	29	39	120	499	1236	1410
Mortality of Later Years per cent. of that in 1920–22											
Males.											
1923 ..	96	79	110	79	79	80	87	74	104	113	114
1924 ..	92	72	108	64	69	63	75	83	104	105	122
1925 ..	87	67	104	79	52	72	62	70	93	106	120
1926 ..	92	68	112	93	67	60	70	68	105	112	124
1927 ..	94	67	116	79	74	68	58	63	107	116	133
1928 ..	97	63	126	93	60	55	55	68	107	136	140
1929 ..	101	73	125	86	60	60	90	79	106	130	150
1930 ..	99	65	128	71	57	63	59	74	109	130	154
1931 ..	94	62	122	86	52	50	55	73	102	124	150
1932 ..	99	60	131	71	50	50	65	70	104	136	170
1933 ..	99	59	132	93	62	50	52	60	105	134	172
1934 ..	97	57	131	71	52	45	46	71	107	134	167
1935 ..	96	51	133	71	38	40	43	65	104	139	174
Females.											
1923 ..	104	95	112	69	86	92	95	115	110	112	116
1924 ..	98	75	116	69	80	67	76	80	110	118	116
1925 ..	104	80	122	69	86	67	85	90	111	131	128
1926 ..	101	74	121	56	71	73	82	80	113	127	128
1927 ..	112	76	139	69	71	67	73	91	131	135	173
1928 ..	112	79	138	69	74	69	66	102	118	147	163
1929 ..	123	81	155	69	63	65	84	106	135	157	196
1930 ..	119	72	155	69	51	56	71	99	131	165	193
1931 ..	123	77	157	69	74	65	73	98	133	167	193
1932 ..	125	75	162	81	57	60	74	95	137	174	193
1933 ..	127	78	164	75	71	63	77	95	132	180	202
1934 ..	128	71	170	63	51	58	71	99	138	184	213
1935 ..	130	71	174	56	60	60	63	97	141	188	223

in the first decade. The best results were obtained in the decades 26–35 and 36–45. In the decade 46–55 there is a definite decrease in the male deaths, but the female deaths have increased considerably. The figures for all the higher decades show a great increase and this is especially the case for females. These figures are very striking, but they might be misleading if there had been a great change in the total number of people alive in each decade. The Registrar-General's report for 1935 contains the

* The Lettsomian lectures delivered before the Medical Society of London on Feb. 21st, March 2nd and 7th.

information which is necessary to settle this point (Table I). The death-rates per million living confirm the general conclusion drawn from the graphs of total deaths. The male death-rate for all ages standardised has varied in the years 1929–35 from an increase of 1 per cent. to a decrease of 6 per cent., compared with the average for 1920–22, but that for females has increased steadily and is now 30 per cent. higher. The death-rate in males at ages under 55 shows a steady decrease, from 21 per cent. in 1923 to 49 per cent. in 1935; the figures for females in these same years have improved from 5 per cent. to 29 per cent. Both these figures suggest that the results of treatment for those under 55 years continue to improve. The most striking decreases in the male mortality occur in the three decades 16–25, 26–35, and 36–45, being respectively 62 per cent., 60 per cent., and 57 per cent., while the decrease for females was respectively 40 per cent., 40 per cent., and 37 per cent. The figures for children under 15 are rather disappointing, being 29 per cent. for males and 44 per cent. for females (who in this instance have done better than males). This may be due partly to the liability of children to develop infectious diseases and also to the difficulty of controlling young children who tend to add sweets and extra food to their diet. It must be remembered also that the expense of the insulin is considerable for poor parents.

The figures for ages 55 and over show a steady increase of the death-rate in males from 10 per cent. in 1923 to 33 per cent. in 1935, compared with the average for 1920–22, while that in females was from 12 per cent. to 74 per cent. in the same years. The mortality-rate of the elderly patients has therefore become much greater since 1923 when insulin treatment was instituted.

Cause of Increased Mortality at Certain Ages

The increase in the mortality figures may be due to the following causes: (1) The disease is more common. (2) The diagnosis is more accurate. (3) The registration of deaths is more complete.

(1) *Increased incidence in an older population.*—Diabetes is known to occur more frequently in middle-aged and elderly people than among the young. Owing to a change in the expectation of life the number of elderly people alive now is greater than it was. In England and Wales the following increase of aged people has taken place: persons over 70 years of age per 10,000 population in 1911 numbered 297; in 1921, 344; in 1931, 426; and in 1934, 455. This is an increase of 158 per 10,000 in 23 years. In the United States the expectation of life between 1901 and 1930 rose from 48 to 59 years for males and from 51 to 62·5 for females; the average age at death rose from 51·5 in 1911 to 58·8 in 1933.

These figures show that more elderly people are alive now than in previous years and there are more persons to be victims of diabetes, and thus increase the total death-rate.

(2) *More accurate diagnosis.*—It is probable that the urine of all patients and especially of female patients is not only examined more often than 30 years ago, but also more often tested for sugar as well as for albumin.

(3) *More accurate registration.*—The death certificates are probably filled up more accurately and when a woman of 75 who has had diabetes for many years dies of pneumonia, bronchitis, or other illnesses, diabetes is included as a secondary factor.

The Registrar-General estimates that since the discovery of insulin there has been an annual deficiency of 500 to 600 deaths in the decades below 55 and that these deaths have been transferred to the decades above 55. He also calculates that between the years 1923 and 1934 the average lengthening of life of the diabetics who in the pre-insulin period would have died before reaching the age of 55 is about ten years.

It is probable that the increase in the mortality figures is due to all three of these causes mentioned above, but it is not possible to say which is the most important of them.

Follow-up of Hospital Patients

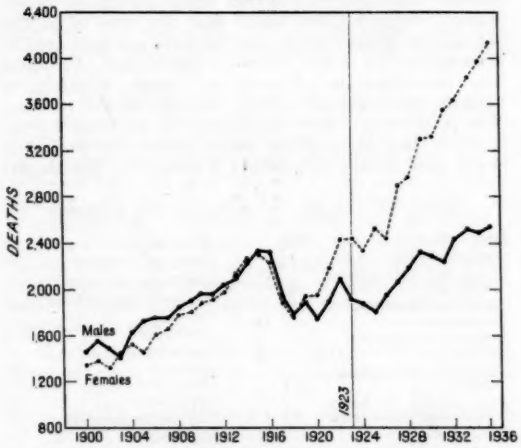
I pass to the mortality figures of 305 patients who were admitted to the wards of St. Bartholomew's Hospital in the ten years 1923 to 1932. The cases in 1923–24 were under the care of Prof. F. R. Fraser; some of those in 1924–28 were under the care of Sir Walter Langdon-Brown; in 1929 some were under Lord Horder, and in 1930–33 some were under Sir Percival Hartley, but the great majority were under my care and I have watched the progress of these in my follow-up department and have readmitted them to the wards if necessary.

The task of following up diabetic patients who have been in a hospital is a heavy one, and becomes greater each year. At St. Bartholomew's Hospital each patient warded for diabetes is written to every three months and asked either to attend on a certain day or to answer certain questions. Between 40 and 60 such patients come to hospital between 10.30 and 12 o'clock once a week. They are instructed to have breakfast and insulin as usual, and during their visit to hospital blood is collected for estimation of sugar. I do not instruct patients to bring specimens of urine or to supply a specimen on arrival, since they are taught to test it for sugar before each dose of insulin, and to increase the dose if the tests are unsatisfactory for two or three days running. Moreover, a specimen passed between 10.30 and 12 o'clock is the most likely to contain sugar, since the blood-sugar has been high at breakfast time even though at the time of excretion of urine it may be so low as to cause symptoms of hypoglycæmia. The estimation of the blood-sugar between 10.30 and 12 o'clock gives a good idea of whether the morning dose of insulin is adequate, and whether the patient is in danger of an overdose, though of course it gives no indication whether the blood-sugar was high at 8 A.M. and will be high at 7 P.M. It is of little value to ascertain the level of the blood-sugar unless some system is devised of letting the patient know it quickly. In some clinics patients attend in the morning for the estimation and in the afternoon to receive instructions depending on the result. In order to save the patient's time I send him a post-card giving the figure for the blood-sugar and any necessary instruction about dose of insulin and diet. I am indebted to Prof. Fraser and to Prof. Witts for

TABLE II—THE FATE OF PATIENTS ADMITTED TO HOSPITAL BETWEEN 1923 AND 1932, ARRANGED IN DECADES

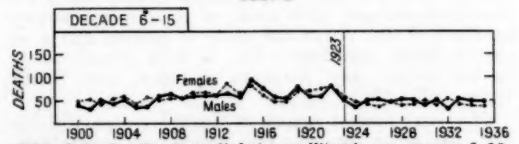
Years.	Total.	Deaths.	No reports.	Alive.
0– 5 ..	2	1	0	1
5–15 ..	29	6 (20·6%)	8	15 (51·7%)
16–25 ..	46	15 (32·6%)	5	26 (56·5%)
26–35 ..	44	17 (38·6%)	6	21 (47·7%)
36–45 ..	52	19 (36·5%)	7	26 (50·0%)
46–55 ..	59	22 (37·3%)	7	30 (50·8%)
56–65 ..	45	23 (51·7%)	4	18 (40·0%)
65– ..	28	18 (64·0%)	2	8 (38·5%)
—	305	121 (39·6%)	39 (12·5%)	145 (47·5%)

FIG. 1



Total number of deaths from diabetes mellitus in England and Wales from 1900 to 1936.

FIG. 2



FIGS. 2-9—Deaths from diabetes mellitus in age-groups 6–15, 16–25, 26–35, 36–45, 46–55, 56–65, 66–75, and 75 upwards.

FIG. 3

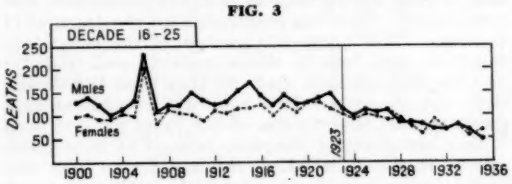


FIG. 4

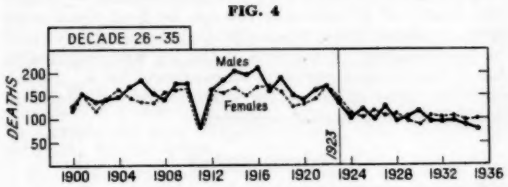


FIG. 5

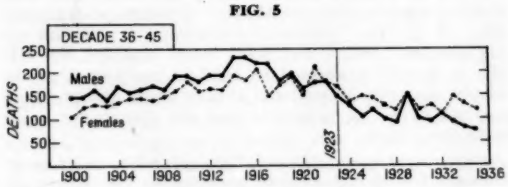


FIG. 6

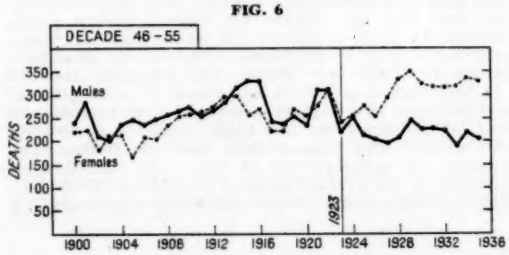


FIG. 7

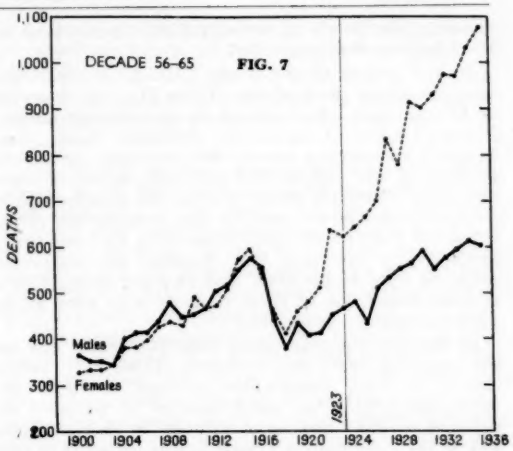


FIG. 8

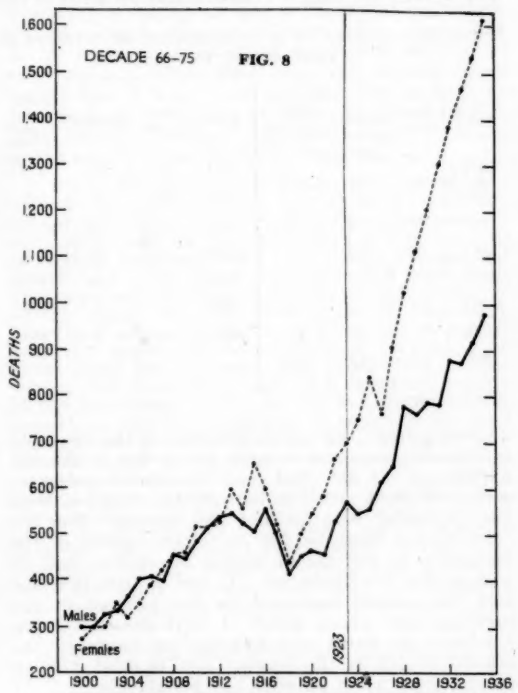
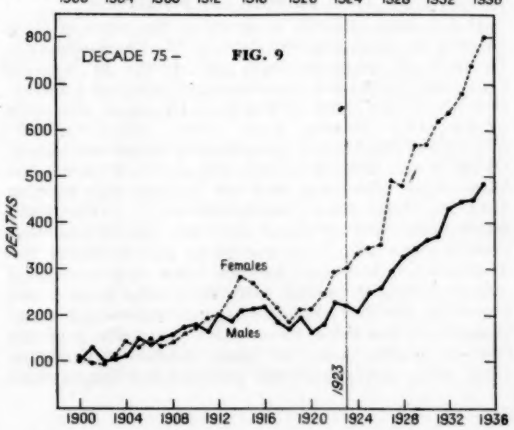


FIG. 9



allowing the blood-sugar estimations to be done in their laboratories since 1924.

In the period of ten years 1923–32 305 patients were admitted to hospital (Table II). Of these 39, or 12·4 per cent., have ceased to attend or to answer letters; some of them are probably dead. One hundred and twenty-one, or 39·6 per cent., are known to be dead and 145, or 47·5 per cent., to be still alive and well. Analysis shows that in the decades under 55 more than 50 per cent. of the patients are alive, except in the decade 26–35 when only 47·7 per cent. survive. In the last two decades the survival-rates are only 40 per cent. and 38·5 per cent., which is natural as some of these patients who were 56 in 1923 are now 71 years old.

In the first ten years there were 118 deaths and in the next five years only 6 deaths (Table III). This change is very remarkable, though it must be remembered that the total number of patients at the end of 1932 had been reduced by deaths from 305 to 187. Actually all the 6 deaths occurred in the

TABLE III—NUMBER OF ANNUAL DEATHS OF PATIENTS IN THE LAST 15 YEARS

Year.	New cases.	Deaths.	Total alive at end of year.	Year.	New cases.	Deaths.	Total alive at end of year.
1923	94	12	82	1931	23	10	170
1924				1932	27	7	190
1925	32	18	96	1933	—	3	187
1926	26	16	106	1934	—	2	185
1927	32	13	125	1935	—	0	185
1928	28	15	138	1936	—	0	185
1929	30	11	157	1937	—	1	184
1930	13	13	157			121	

1924–25 group. The great difference in the mortality in the early and late years is partly due to the disappearance of the bad and unreliable patients; several of these either would not diet at all or were very irregular both in diet and insulin. But the chief change must be due to (1) the spread of the knowledge of the use of insulin by doctors, and (2) a change in the treatment. It was in 1930 that the diet was greatly improved by the increase in the carbohydrate ration which I will describe later. I suspect the extra carbohydrate has improved the general health of the patient and enabled him to recover from acute illnesses like pneumonia.

It has been difficult to discover the *cause of death* as only a small number died in St. Bartholomew's. In spite of inquiries from the doctor or hospital concerned I have been unable to get sufficient information about the cause of death in 16 out of 121 cases (Table IV). Deaths from coma numbered 28; in only 3 of them was a complicating factor mentioned. Of the 3 who died in St. Bartholomew's 2 died a few hours after admission and one patient who died in 1924 had been given insufficient insulin. From the information received about the other cases it was clear that in some no insulin was given and in others the dose was not increased enough; but this mistake is nowadays less frequent. Of the deaths from coma 8 were in the first three years, 9 in the second three years, 8 in the third three years, and only 3 in the last six years; none of these deaths occurred in 1934, 1935, and 1937. Our patients are taught that insulin must not be omitted when an illness supervenes; doctors have learnt that the dose of insulin must then be increased, and patients are now sent to hospital earlier in the course of the disease. Provided this procedure is adopted and large amounts of insulin and sugar are given, patients should recover. The transfer of a very ill patient by ambulance from a warm bed on a chilly night makes the prognosis worse and should be avoided if possible. The largest

TABLE IV—CAUSE OF DEATH OF 121 PATIENTS

Coma alone	25	Heart failure	8
Coma and pneumonia	1	Gangrene of leg	6
Coma and tuberculosis of lungs	1	Coronary thrombosis	4
Coma and vomiting	1	Cerebral hæmorrhage	3
Coma (total)	28	Uræmia	4
Pneumonia	12	Abscesses	3
Broncho-pneumonia	3	Carcinoma	5
Bronchitis	1	Jaundice	1
Tuberculosis of lungs alone	16	Ulcerative colitis	1
Tuberculosis of lungs and gangrene of lungs	1	Erysipelas	1
Tuberculosis (total)	17	Vaginal hæmorrhage	1
"Influenza"	7	No details	16

amount of insulin I have given in 24 hours to a comatose patient was 940 units, together with 140 g. of carbohydrate and 1200 c.cm. of fluid intravenously on the first day; and 400 units of insulin, 220 g. of carbohydrate, and 2000 c.cm. of fluid intravenously on the second day (Graham, Spooner, and Smith 1929).

The next largest causes of death were pneumonia and its allies broncho-pneumonia and bronchitis, which accounted for 16, not counting the patient who died in coma during the course of the pneumonia, and tuberculosis which was responsible for the death of 17 patients. This figure is high but in the early days sanatoria were loth to admit patients with diabetes and the arrangements made for their food and insulin were not adequate. It is now well recognised that patients with tuberculosis of the lungs do very well if they are given an adequate amount of insulin and greatly increased carbohydrate, and deaths from this cause should be reduced. Arterial conditions caused the death of 10 patients though as 3 of them died from cerebral hæmorrhage the diabetes could not well be incriminated. Gangrene of the leg was responsible for 6 deaths and coronary thrombosis for 4. I shall refer to these again. The other causes of death do not call for any special comment.

COMPLICATIONS

Patients who have had diabetes for some time may develop various complications. A complete examination of all the patients attending my follow-up department would not have been feasible, but Dr. W. G. Oakley examined in 1937 an unselected group of 100 patients, all well and able to work except those too old to do so, who had had the disease for more than five years.

These 100 patients were spread fairly uniformly through the decades as 49 were under the age of 45 and only 4 children are included. The largest group, 46, had had the disease for from 5 to 10 years, though 15 gave a history of more than 11 years, and 1 of these of 18 years. The insulin dosage is shown in Table V. Three cases of mild diabetes are included, 2 of whom have been able to give up insulin, but the biggest group needed between 26 and 50 units, and no less than 7 needed more than 100 units. The biggest dose was 160 units. The amount of carbohydrate in the diets varied from 40–310 g.; the average amount was 155 g. (Table VI). The smallest amount (40 g.) is taken by a man aged 74,

who has had diabetes for 16 years. He refused to have insulin and his blood-sugar is always over 300 mg. per 100 c.cm. He keeps fairly well and apart from lenticular vacuoles has remarkably few symptoms.

The blood-sugar of these 100 patients on their last ten visits to hospital is shown in Table VII. Their diabetic condition is under fair control, as in 52 the blood-sugar was below 130 mg., in 28 between 130 mg. and 170 mg., and in 12 between 175 mg. and 200 mg. per 100 c.cm. (Table VII). In 8 patients the condition is badly out of control; 1 patient refuses insulin but the other 7 take fairly large amounts of insulin and either suffer from symptoms of overdosage or have occupations which render it inadvisable for them to take larger amounts of insulin.

The following complications have been analysed: local reaction to insulin; blood pressure; arterial

TABLES V, VI, AND VII SHOW: (V) INSULIN REQUIREMENTS OF 100 UNSELECTED PATIENTS, (VI) AMOUNT OF CARBOHYDRATE TAKEN BY 100 PATIENTS, AND (VII) AVERAGE OF 10 ESTIMATIONS OF THE BLOOD-SUGAR IN 100 PATIENTS. BLOOD WAS COLLECTED BETWEEN 10.30 A.M. AND 12 NOON

V		VI		VII		
Units of insulin.	Patients.	Carbohydrate (grammes).	Patients.	Blood-sugar (mg. per 100 c.cm.).	Cases.	
None.	3	40	1	Under 75	1	
0– 10	3	41– 75	0	80–100	12	80
11– 25	16	76–100	5	105–130	39	
26– 50	43	101–130	27	135–170	28	
50– 75	17	131–150	27			
76–100	11	151–175	14	175–200	12	
101–200	7=100	176–200	17	205–250	3	20
		201–250	7	260–300	1	
		251–300	1	300	4	
		310	1=100			

changes; neurological symptoms; ocular symptoms; liver symptoms.

(1) *Local reaction to insulin.*—In all 29 patients had some local reaction as the result of the insulin.

(*a*) Well-marked *atrophy* of subcutaneous tissues was seen in 7 cases, including the 2 patients described by Carmichael and Graham (1928). The fat has not returned to the areas.

(*b*) *Hypertrophy* of the subcutaneous tissues was seen in 20 patients. In some cases the tumours were large. The patients used these areas because injections caused less pain than elsewhere, but when they stopped doing so the swellings gradually disappeared.

Both atrophic and hypertrophic changes are attributable to injections of insulin into the same areas over long periods. Nowadays patients are always instructed to vary the site of the injection as much as possible. Neither change causes any real inconvenience or is noticed unless the patient exposes his body as in bathing. One patient is very sensitive about this disability.

(*c*) Local pain and reactions occurred in 2 patients. The local reaction was very severe with all kinds of insulin (A.B., B.W., Boots, Eli Lilly, Leo, and B.W. crystalline insulin). Both patients were desensitised by injections of small and increasing amounts of insulin starting with 0·05 c.cm. of a 1 in 200 dilution.

Two patients, not in this series of 29, complained of a stinging sensation when the insulin was injected. This was completely relieved by changing to a brand of insulin in which the sodium chloride content was isotonic.

(2) *Blood pressure.*—Analysis of my cases suggests that diabetes has no special effect on the blood pressure.

(3) *Arterial changes* were detected by clinical means in 13 patients; no evidence of calcification was obtained by X rays. Analysis of the cases suggests that arterial change is mainly a disease of old age. It does, however, occur in some young diabetics and the youngest case in this series is only 31. The severity of the disease does not seem to play any part in the causation.

Treatment of gangrene.—In this connexion a point in the treatment of gangrene is noteworthy. Much stress has been laid on the importance of keeping a gangrenous area dry because of the danger of a moist spreading gangrene, and a dusting powder is usually employed for this purpose. I am sure that this treatment is correct so long as the skin is unbroken, and when the toe has shrivelled up giving a good line of demarcation it is often possible to do a local amputation. When there is a raw surface many believe that it is so important to keep the toe dry that they use a dusting powder and dry dressings. Quite recently I realised that this treatment is wrong as the result of the following experience.

I was called to see an old man who had already lost one leg with gangrene and whose diabetes was not quite under control. He had developed a superficial blister and this had been kept dry with a zinc and starch dusting powder. Five days later he had a rigor and when I saw him some few hours later there was œdema over the dorsum of the foot nearly to the ankle. As the ulcer looked so unhealthy I put on a gauze pad soaked in Eusol and covered it with dry gauze, jaconet, and wool. Twenty-four hours later his condition was much better; the œdema had ceased to spread and it decreased rapidly in the next three days. As the wet eusol dressing seemed to defy the principles on which I had been brought up—i.e., that the ulcer on a diabetic's foot must be kept dry—the ulcer was again powdered and the powder removed each day with eusol. A week later the ulcer was deeper and very unhealthy so a eusol dressing was again applied. The ulcer seemed much cleaner after 12 hours and I then decided to pack the ulcer with wet eusol gauze, to put much powder on the skin round the wound, and to cover it with dry gauze, jaconet, and wool. The powder kept the surrounding skin dry and the wound healed rapidly.

Since then this form of wet and dry dressing has been used on 5 other diabetic patients and the results have been very striking. I am sure that it is wrong to attempt to keep an open sore or a discharging sinus dry and that it is important to keep the deep tissues in contact with a wet dressing. The skin can be kept quite dry by the powder and in our cases never became sodden.

(4) *Neurological symptoms.*—These included changes in the knee-jerks (6), ankle-jerks (11), vibration sense of the legs (22), sense of touch (3), and sense of pinprick (4). The most tiresome complaint made by diabetic patients is that of *pain*, which is usually but not invariably in the legs. In its most characteristic form it is not associated with any changes in the knee- or ankle-jerks, and the sense of touch or pinprick is unaffected. The symptoms may resemble those of tabes dorsalis, as the patient complains of shooting pains in the legs, which may lead up or down or go at right angles into the leg.

One patient in addition complained of a girdle pain. When I examined her I was much astonished to find that the pupils reacted to light, that the knee- and ankle-jerks were very brisk, and that there were no areas of sensory loss on the face or limbs. Dr. C. P. Symonds, who saw her with me, pointed out that the vibration sense of the legs was absent. The blood Wassermann reaction and the cerebro-spinal fluid were quite normal, and therefore excluded the diagnosis of syphilis and tabes dorsalis.

The symptoms are usually not so extensive as in this case, but are limited to the legs. They may, however, be present in an arm or hand, and as in this case the vibration sense of all the limbs and vertebræ may be affected; but I have never known that of the skull altered. It is very rare for any incoördination to be present. The condition generally but not always occurs in elderly patients and usually after the disease has been present for some years, but I have seen a patient who went to his doctor solely on account of the pain in his feet and legs, the diabetes being discovered in the course of a routine examination. The severity of the symptoms bears no relation to that of the diabetes.

The treatment of this pain is very unsatisfactory but it does get well in the end. I believe that it is essential to get the diabetes under complete control with insulin and give a good balanced diet containing at least 150 g. of carbohydrate. In the last year I have given vitamin B in the doses in which it is efficacious in the treatment of alcoholic neuritis, but I do not think any real benefit ensued. The ordinary drugs, aspirin and phenacetin, which relieve the pain in neuritis seem to have no effect in this condition. The only thing which I have found of value is butyl chloral hydrate in doses of gr. 5 to gr. 10 in association with Tr. gelsemium ℥ 15 to 30. This medicine is unpleasant to take but does seem to relieve the pains somewhat. The latter disappear after months when the diabetic condition has been brought under control, and do not in my experience recur. The vibration sense, which is I think of diagnostic value, is not recovered, but remains absent for years after all the pains have subsided.

The cause of this syndrome is difficult to explain. It is clearly not due to a peripheral neuritis as the reflexes are quite normal; similarly any affection of the roots of the nerves—i.e., radiculitis—can be excluded as there is no sensory loss. It has been suggested that the pain is due to a lesion of the intraspinal tracts. This hypothesis was first put forward by Gowers to explain the pains of tabetic patients, and Feiling (1937–38) in a recent review of this subject has accepted Gowers's hypothesis.

(5) *Ocular symptoms.*—The following changes were observed: senile cataract (18), lenticular vacuoles (6), arterio-sclerosis of retinal vessels (13), hæmorrhages (5), exudates (5), and tobacco amblyopia (1).

(6) *Liver symptoms.*—Jaundice is a very unusual complication, for none of my friends—the late Dr. Otto Leyton, Dr. E. P. Poulton, or Dr. R. D. Lawrence—have noticed it, and I cannot find any mention of it in the literature. It occurred in a series of my cases. The first was noticed in May, 1935, and in the two and a half years since then there have been 28 cases in hospital but none in private practice. The symptoms complained of are usually loss of appetite, nausea, and then the passing of dark urine and occasionally of pale stools.

The patients have not looked particularly ill. They have been admitted to hospital as a precautionary measure, 2 only having been nursed at their homes. All made good recoveries, with one exception. In his case the jaundice was already subsiding when a hæmaturia started. The urine on culture contained *Bacillus coli*, and the patient developed an ascending pyelonephritis of which he died. The liver showed a patchy destruction which was mainly perivascular in distribution. The liver tissue in these areas was replaced by fibrous tissue in which were many round cells, but the bile capillaries remained unaltered. The stools were often said by the patients to be pale, but only on two occasions was this noticed after admission, and the next day the stools again contained bile. The van den Bergh test always gave a direct positive and the result of the indirect test was sometimes very high, 60, 45, 45, 36, and 34 units. The more usual figures were 10 to 20 units although figures as low as 4·4 and 5 units were recorded.

The jaundice took a long time to disappear; its shortest duration was 31 days and its longest 90 days.

As to *treatment* the patients were kept in bed whenever possible until the jaundice as measured by the van den Bergh test had decreased to within normal limits, but several patients had to be allowed to return to work when it was 4 to 7 units; in only 5 cases was it less than 3 units.

The carbohydrate of the diet was raised to 200 g. and the fat reduced to a minimum of 10 g. or less. The insulin requirements were always increased and in some cases remarkably so. The greatest increase was from 42+42 to 80+72—i.e., by 68 units—and the average increase was 44 units. Most of the patients were fairly easily controlled in spite of these big doses, but in 3 cases a third dose of insulin had to be given before the urine was sugar-free. When the condition began to improve the patients had repeated attacks of hypoglycæmia, most often after the evening dose. This resulted sometimes (but not always) in a great disproportion between the morning and evening doses, which were in one case 58+16, 34+12, and 36+20. The average dose of insulin before the jaundice was 35 units, during the jaundice 77 units, and on discharge 53 units.

During the next 1½ to 2½ years there have been no signs of relapse; the patients keep well and the insulin continues to decrease and is now practically the same as before the illness.

I have been much perplexed over this curious complication but have found no common factor in the patients affected. The trouble is certainly not due to the balance of the diet—130 g. to 150 g. of carbohydrate, 70 g. of protein, and 100 g. of fat—as I have been using this balance for 5 to 7 years, and so have many others. It is not due to any special medicine—e.g., a laxative of liquid paraffin and phenolphthalein, as not every patient had these. I thought for some time that it might be due to something injected with the insulin.

The syringes in hospital at the time insulin was introduced were kept in a mixture of methylated spirit and lysol, and I adopted this solution for all insulin syringes, the patients being instructed to wash them out in six changes of water. It seemed possible that the washing might have been insufficient and that minute amounts of lysol injected with the insulin had been responsible for the damage to the liver. Against this hypothesis is the fact that one patient had not had insulin and two others kept the syringe in alcohol. The syringes are now kept in industrial spirit and washed out with ether. This is squirted onto the cotton-wool used to clean the insulin cap and the skin. The plunger is then moved up and down a few times to dry the syringe which makes the measuring of the insulin much easier. Several cases of jaundice have occurred since this precaution was adopted.

I have come to the conclusion that the jaundice must be due to an infective agent, and that it must be passed from patient to patient at hospital, as it has not occurred in other series of cases or in private. The days of attendance at hospital and of the development of the jaundice have been ascertained but no direct contact from case to case could be discovered.

Disabilities of the Diabetic under Insulin

The critical examination of the mortality tables and of the complications confirm the clinical experience of the great value of insulin—i.e., that the patients feel well, are able to lead a normal life with a few exceptions, and may produce healthy children. They suffer from certain disabilities. They cannot insure their lives except at heavy rates of premium, they cannot enter employment which carries pension rights, they need especial care and attention during an illness, and they may be unreliable because of attacks of hypoglycæmia. I do not wish to discuss the ordinary symptoms of hypoglycæmia but rather the special difficulties that may arise. The great majority of patients always have the same symptoms and recognise them at once. A minority do not recognise them and may develop fits, amnesia, appear drunk, or become unconscious. Young children seem to have great difficulty in recognising the attacks, but as they grow older become able to do so. Some patients, however, who have always recognised the symptoms cease to do so and then become unreliable. This is especially inconvenient if they have been in the habit of driving a car, for they may cause serious damage either to themselves or to other persons. I am never pleased when patients taking insulin drive motor-cars, although many do so without misadventure. They should take an extra 10 or 15 g. of carbohydrate whenever they drive between the hours of 12 noon and 1 P.M.—i.e., about 4 hours after the dose of insulin—and should never continue driving after the usual hour for the midday meal unless they take a further 5 or 10 g. of carbohydrate. They should never drive after 10 P.M. without taking extra carbohydrate and should never take any alcohol when they are going to drive a car. If they will keep to these regulations the chance of hypoglycæmia incapacitating them will be very small. I have already mentioned the change in the type of reaction which may take place and one of my patients, a man aged 50 who used to have very severe attacks which he did not recognise, has had two other manifestations: (1) a severe and uncontrollable diuresis while walking in the park, a symptom which I have seen once before; and (2) a condition of lethargy and lack of energy which was associated with a low blood-sugar and relieved by the reduction in the dose of insulin by 12 units. When patients begin to develop attacks of hypoglycæmia which they do not recognise they must reduce the dose of insulin even though glycosuria is present; but unfortunately patients who do this may still develop sudden attacks. Another tiresome manifestation is the occurrence of symptoms 1 to 2 hours after the insulin injection, at a time when the blood-sugar is still high. This is believed to be due to the blood-sugar decreasing more rapidly than usual. It can be relieved by giving a buffer meal fairly soon after breakfast but often prevents an adequate dose of insulin from being given.

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SERUM AND SULPHANILAMIDE IN ACUTE MENINGOCOCCAL MENINGITIS

A PRELIMINARY SURVEY BASED ON 113 CASES

BY H. STANLEY BANKS, M.A., M.D. Glasg., D.P.H. Camb.

MEDICAL SUPERINTENDENT, PARK HOSPITAL (L.C.C.)

LAST July it was arranged that while this investigation was in progress cases of meningococcal meningitis admitted to the general hospitals of the London County Council should be transferred, as far as practicable and as soon as the diagnosis was suspected, to the Park Hospital. This arrangement has concentrated the material and has brought the cases at an earlier stage under the care of officers responsible for treatment to a termination. I have to thank the medical superintendents of many general hospitals for transferring their cases so promptly, usually within 24 hours. The favourable results now reported would have been impossible of attainment without this coöperation. Three series are reviewed in this paper:—

I.—Thirty-eight acute cases treated with serum intensively by venous, lumbar, cisternal, and occasionally ventricular routes (December, 1933, to April, 1937).

II.—Fifty-nine acute cases treated with intravenous serum and sulphanilamide by mouth (May, 1937, to May, 1938). No intrathecal serum was given.

III.—A small series of sixteen acute cases treated exclusively with sulphanilamide by mouth (April–June, 1938).

The serum used throughout was "meningococcus antitoxin" (Parke, Davis and Co.).

Serum Alone

In Series I the standard method of intrathecal serum injection, popularised by Flexner, was supplemented by a large dose of serum intravenously (90–120 c.cm.) on admission and also (in moderate and severe cases) on the following day. In addition, the cisternal route was generally employed in alternation with the lumbar on each day for five days from admission. When the cerebro-spinal fluid (C.S.F.) was not sterile within five or six days, the ventricular route was used, with apparent success in three cases. The average amounts of serum used per case were: venous 135 c.cm., lumbar 82 c.cm., cisternal 60 c.cm. —a total of 277 c.cm. (cost at hospital rate £9 approximately). It is not proposed to consider this series in detail, since the method, though efficient, is laborious and cisternal puncture is not without danger. Most recent work on serum treatment tends to emphasise the value of the intravenous route and to discourage spinal routes of injection except in special circumstances.

In order to assess the value of specific treatment it is usual to exclude certain groups of cases to which such treatment is inapplicable. Series I consists of every case received during the period except the following: four very acute cases dying within 24 hours of admission; eight cases admitted between the third and fifth week of the disease with subarachnoid block already established; six cases with sterile C.S.F. and deemed to be recovering on admission; and three cases in which there was evidence that the serum employed was inert through faulty storage at a temperature of 54° F. or more during a period of seven months. (It is considered

important that meningococcal serum should be used within six months of production and should be stored in a refrigerator.)

Table I classifies the remaining thirty-eight cases in age-groups.

TABLE I—CASES TREATED WITH SERUM (INTRAVENOUS AND INTRATHECAL) ONLY

Age-group.	Cases.	Bact. group.			Not bact. verified.	Deaths.	Fatality-rate (per cent.).
		I.	II.	Inag-glutin.			
0–	—	—	—	—	—	—	—
1–	12	5	2	2	1	1	8
5–	13	7	2	1	1	Nil.	Nil.
20–40	12	5	4	—	1	5	41
50+	1	1	—	—	—	Nil.	Nil.
Total	38	18	8	3	3	6*	16

**Deaths*

1. Male aged 25. Recovered from acute stage; died in a relapse.
2. Male aged 24. Died 30 hours after admission from pericarditis.
3. Female aged 22. Died from pericarditis and pneumonia. Post mortem: meningitis cleared up.
4. Female aged 1 yr. 2 mths. Died of toxæmia; the organism was quite atypical morphologically and culturally, and was agglutinated by Groups I and II sera.
5. Female aged 25. Died of cisternal hæmorrhage. Post mortem: meningitis almost cleared up.
6. Female aged 20. Died of trauma from cisternal puncture.

The importance of age-grouping in the assessment of results is clearly shown by Sturdee (1936) in his record of the fatality-rate of 2618 cases of meningococcal meningitis treated in hospitals in this country. Excluding cases dying of intercurrent disease or within twenty-four hours of admission these were:—

Age-group.	No. of cases.	Fatality-rates (per cent.).
0–	292	67·8
1–	611	36·5
5–	1028	24·6
20–	562	44·0
40–	74	60·8
50+	51	76·5

COMMENTS

(1) All cases were bacteriologically verified except three, and the type was determined in twenty-nine cases. The serum was apparently effective in Group II cases as well as in Group I. It had apparently no effect in one case in which the organism was highly atypical and probably outside the range of antigens from which the serum was prepared. The resolution of the acute stage usually occupied three or four days, during which the cell count of the C.S.F. remained high and thereafter fell rapidly. The fluid was usually free from organisms within 24 hours, but in about a fifth of the cases meningococci persisted for several days, occasionally longer.

(2) With a single exception (Table I, Case 4) the deaths were due to complications or incidental happenings, and not to the natural progress of the disease. There were three relapses.

(3) Relapses in serum-treated cases are difficult to treat intensively with serum. One such case died; another was very mild and responded to small doses of serum; in the third which also recovered serum was injected into the ventricles (Banks 1935).

(4) Complications: one case each of ocular and deltoid paresis occurred and cleared up completely. Absolute and apparently permanent deafness developed in one case.

(5) Cisternal puncture was employed routinely in thirty-five cases, and was deemed responsible for two deaths. Although it has advantages over lumbar puncture it must be considered unsafe and should in future be employed only in special circumstances.

(6) The fatality-rate for the series (16 per cent.) was low for purely serum-treated cases. The age-grouping of the series was favourable; there were no infants under twelve months of age. Mortality was chiefly in the age-group 20–40.

(7) It may be concluded that specific antiserum used intensively as outlined above at a reasonably early stage of the disease is a highly effective remedy. From what follows, however, it will be seen that more rapid resolution and even better results are obtainable by a simpler method. Accordingly I now consider the use of intrathecal serum obsolete.

Combined Serum and Drug Therapy

In this series of fifty-nine cases the serum was employed in massive dosage, intravenously only (except in infants in whom it was found convenient to inject it into the peritoneal cavity.) No intrathecal serum was given. Sulphanilamide was given in high initial dosage by mouth and the dose was gradually decreased after three days.

Intravenous serum in this disease was formerly believed to be useless because the blood-brain barrier excludes foreign protein from the cerebrospinal fluid (Worster-Drought and Kennedy 1919). This, however, is only true for normal subjects. Flexner and Amoss (1917) induced aseptic meningitis by injection of sterile horse-serum into the theca, and so increased the passage of specific antibodies from the blood to the fluid. Herrick (1918) advocated the use of intravenous as well as intrathecal serum, and large intravenous doses were later used in a small series by Carbonell and Cook (1929) and Banks (1931). Hoyne (1936), in 96 cases with fatality-rate of about 16 per cent., produced strong evidence in favour of massive intravenous serum treatment alone, without intrathecal treatment. The disadvantages of intrathecal serum are:—

(*a*) It is an irritant; it keeps up the cell count of the C.S.F. with tendency to persistence of meningococci for a few days; it gives rise to increased rigidity and other signs of meningitis. It thus delays resolution and prolongs recovery.

(*b*) In hospital practice, owing to the varying skill of personnel, the cases so treated may suffer from traumatic hæmorrhage into the theca leading to local adhesions and blockage. The area then becomes unsuitable for further treatment. Cisternal puncture may be used as an alternative, but it is dangerous.

(*c*) Daily or twice-daily spinal puncture of a rigid, irritable patient is laborious and time-consuming, requires a considerable staff, and is irksome to the patient.

Gordon (1920) suggested that the clinical potency of antimeningococcal serum was due to its anti-endotoxic capacity. Hoyne (1936) interpreted the disease as a blood-stream infection with accompanying toxæmia, and meningitis as a complication. He considered that treatment should be directed primarily against the toxæmia and therefore advised that serum should be given in massive doses intravenously. Hoyne's dosage was very large and costly, averaging 660 c.cm. antitoxin (hospital cost £22) for adults and 360 c.cm. for children (hospital cost £12).

Fortunately the use of sulphanilamide in combination with the serum has rendered such extravagant dosage unnecessary. In the present series I used an initial dose of antitoxin of 120 c.cm. for an adult and 90 c.cm. for a child or in a mild case. In moderate and severe cases the dose was repeated on the following day, unless, as not infrequently happened, the patient then was obviously getting better. In infants absorption from the peritoneal cavity is so rapid that it is unnecessary to attempt venepuncture of small veins and unwise to use the superior longitudinal sinus. Intraperitoneal injection of the serum is easy and safe and is followed by rapid absorption into the blood stream. Intramuscular injection of the small doses of 10–50 c.cm. commonly employed in this country is, in my opinion, of uncertain value and generally ineffective. The average dose actually given in this series was, in 35 intravenous cases, 150 c.cm. (hospital cost £5) and in 15 intraperitoneal cases (infants) 135 c.cm. (hospital cost £4 10*s*.). The practical advantages of this method are that one

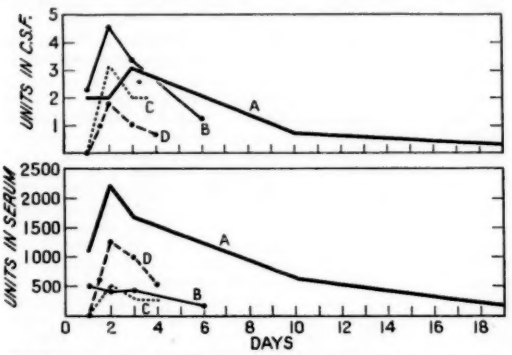

FIG. 1.—Curves showing the concentration of horse-serum in the cerebro-spinal fluid and serum of four patients with meningococcal meningitis after intravenous injection. The doses were as follows:—

Patient A.—Male aged 8. On admission: 120 c.cm. at 11 P.M. First day: 90 c.cm. at noon.

Patient B.—Female aged 4. First day: 90 c.cm. at 6 P.M.

Patient C.—Female aged 47. First day: 120 c.cm. at 5 P.M. Second day: 90 c.cm. at noon.

Patient D.—Female aged 4. First day: 120 c.cm. at 10 P.M. Second day: 120 c.cm. at noon.

or two large doses suffice; that few lumbar punctures are needed; that there is less discomfort and less risk to the patient; and that the difficulties of blockage are practically eliminated. As pointed out some years ago (Banks 1931) unconcentrated antimeningococcal sera injected intravenously hardly ever cause any symptoms of shock, and large doses may be so injected with impunity. Peters (1935) found the same to be true for *unconcentrated* anti-diphtheria serum. It, too, could be given intravenously without producing rigors or hyperpyrexia.

Although the main action of intravenous or intraperitoneal serum may be exerted in the blood stream and tissues it is important to form some idea of the extent and rate of penetration of the serum through the damaged membranes to the C.S.F.

Thompson (1937) showed that after intravenous injection of serum in one case of meningococcal meningitis, the presence of horse-serum and agglutinins could be detected in the C.S.F. within two hours. The amount of horse-serum in the C.S.F. in relation to that in the blood stream in 27 cases in this series has been investigated by Dr. J. M. L. Burtenshaw, whose results will be published separately. Using a precipitin test (immune rabbit serum against dilutions of C.S.F. and blood-serum) he found that the amount of horse-serum proteins in the C.S.F. follows closely after a short time-lag the amount contained in the blood stream, but is only a small fraction of it. Fig. 1 shows the results in four cases. In these, after intravenous injection of amounts of serum varying from 90 to 240 c.cm., the horse-serum protein shows values in the blood ranging from 500 to over 2000. The corresponding figures for the C.S.F. range from 1 to 4·5, or generally about 1/100th to 1/600th of the amount present in the blood stream. The horse-serum is maintained in small amount in the C.S.F. for many days after one or two large intravenous injections (Fig. 1).

ACTION AND DOSAGE OF SULPHANILAMIDE

Buttle, Gray, and Stephenson (1936) first showed the efficiency of sulphanilamide in meningococcal infections in mice, and Proom (1937) showed that the drug when given orally at the same time protected mice against approximately a million lethal doses of meningococci of either Group I or Group II. Whitby's work (1937) was confirmatory for sulphanilamide, but found that benzylsulphanilamide (Proseptasine) and also the preparation known as Soluseptasine were *inactive* in experimental meningococcal infections. Whitby (1938) has recently found that another compound 2-(*p*-aminobenzenesulphonamido) pyridine (M. & B. 693) is as active as sulphanilamide against the meningococcus under experimental conditions in mice. Jauerneck and Gueffroy (1937) showed that Prontosil base (red) and Prontosil Soluble passed from blood to C.S.F. much more slowly than sulphanilamide. It is therefore important in this disease to use only those compounds, such as sulphanilamide, which have been found to be active against meningococci.

The data of Marshall, Emerson, and Cutting (1937) suggested to me that a total daily amount by mouth of about one gramme per stone of body-weight, divided into four-hourly or six-hourly doses, would secure a high but not toxic concentration in the blood. I have found this dosage appropriate except that infants both tolerate and require about 3 times and young children about 1½ times this standard. The inadequacy of standard dosage was shown in the first infant in which it was tried.

A. B., aged 5 months, admitted on August 27th, 1937, on the fifth day of the disease. Rigidity was slight, general condition good: Group II infection. Sulphanilamide 1·0 g. daily was given for ten days. The dose was then increased to 2·0 g., and later to 4·0 g. daily, but it was too late. The disease was uninfluenced, and meningococci were found daily in the C.S.F. The child died from toxæmia and pressure symptoms on the seventeenth day of treatment. (Owing to the inadequacy of the dosage this case has been excluded from Series III.)

The initial dosage actually employed in Series II and III ranged from a minimum of 3·0 g. daily (under two years) to a maximum of 10·5 g. daily or thereby in adults. Over the age of forty years the maximum was decreased to 9·0 g. daily owing to the diminished tolerance and slower excretion of the drug in old people. This initial dose was maintained not longer than three days. As the C.S.F. was almost always free from meningococci in 24–48 hours, the dosage was then gradually reduced. The period of treatment averaged about 9 days.

ADMINISTRATION OF SULPHANILAMIDE

The oral route is the simplest and most satisfactory. It has been found applicable to all cases

except a very few which were so deeply comatose that the swallowing reflex was abolished. In these cases the nasal tube was used or a gag inserted in the mouth and a stomach-tube passed. Vomiting was very rarely a disturbing factor. A convenient method of oral administration in acutely ill patients is as follows:—

Crush the tablets finely and add the powder slowly to water in a filler funnel with a wide outlet to which a No. 9 to No. 12 catheter is attached. The catheter is passed into the back of the mouth and the suspension allowed to run in slowly. The patient

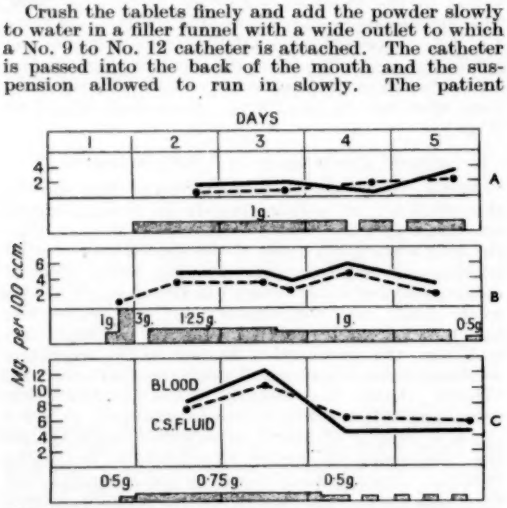

FIG. 2.—Sulphanilamide content of blood and C.S.F. in three representative cases (A = low absorption; B = medium absorption; C = high absorption). Dosage of drug indicated by stippled areas.

swallows as he lies recumbent and this obviates any necessity to bend forward the rigid neck.

When given by mouth, the drug is rapidly absorbed into the blood stream and C.S.F. (Marshall et al. 1937). I am indebted to Dr. E. N. Allott for examining for sulphanilamide content serial samples of C.S.F. and blood from some 55 cases. He publishes his results in an accompanying note, and it will be seen that the vast majority showed absorption curves similar to the three specimen graphs in Fig. 2,

TABLE II—INITIAL DOSAGE OF SULPHANILAMIDE DURING FIRST THREE DAYS OF TREATMENT

Age-period (years).	Daily amount (g.).	Remarks.
0–	3·0	Standard dose: 1·0 g. daily per stone weight. Six doses daily: 4-hourly. Infants = standard dose × 2 or 3. Over 40< standard dose. Minimum: 3·0 g. daily. Maximum: 10·5 g. daily.
2–	4·5	
5–	4·5– 6·0	
10–	6·0– 7·0	
15–	9·0–10·5	
40 +	9·0	

After 3 days, gradually reduce dosage.
Period of administration: about 9 days.

except that the upper graph represents an unusually low concentration in blood and C.S.F. Dosage in this case was considerably below the standard recommended. The amount of free sulphanilamide absorbed into the C.S.F. as estimated by Allott was on a lower scale than that reported by Marshall et al (1937), and by Long and Bliss (1937). There is agreement with regard to the relation between the blood and C.S.F. values. The latter is approximately the same or only slightly lower than that of the blood at any given time after the first few hours. After 16 hours on the standard dosage given above, the sulphanilamide in the blood and C.S.F. stands at 2 mg. or more per 100 c.cm. and after 24–48 hours 5 mg. or more per 100 c.cm. In infants and young children with the higher proportional dosage the C.S.F. level rose in two cases as high as 19 and 26 mg. per 100 c.cm. As soon as the dose is reduced the level in blood and C.S.F. falls rapidly. It is believed to be important to maintain the concentration in the C.S.F. at a certain level—e.g., 3–5 mg. per 100 c.cm.—for at least three days (Allott's note, Cases 16 and 24). The initial scale of dosage (Table II) is adequate for this, and should not be reduced since there appear to be some cases in which absorption into the C.S.F. is considerably lower than the average, while a few may be considerably higher. This is shown for two pairs of cases comparable in age, weight, dosage, absence of vomiting, and other factors (Table III).

In several small series of cases (Schwentker et al. 1937, Eldahl 1938, and Willien 1938) a saturated

TABLE III—SHOWING EXCEPTIONAL VARIATION IN AMOUNT OF SULPHANILAMIDE PRESENT IN C.S.F. AFTER APPROXIMATELY EQUAL DOSAGE

Day of treatment.	Dose in grammes.		C.S.F. mg./100 c.cm.	
	P. Q. (M. 4 yr. 8 m.)	R. S. (F. 5 yr.)	P. Q. (high).	R. S. (low).
1	2·5	1·5	—	—
2	4·5	4·5	8·5	1·8
3	4·5	4·5	—	3·8
4	4·5	4·5	8·0	2·8
5	4·5	3·5	9·7	4·3
6	4·0	3·0	—	3·5
	T. U. (M. 28 yr.)	V. W. (M. 28 yr.)	T. U. (high).	V. W. (low).
1	10·75	4·0	—	—
2	9·75	11·25	9·2	2·8
3	7·5	8·25	—	3·8
4	6·0	6·0	7·8	5·1
5	5·0	6·0	—	2·9

solution of sulphanilamide (0·8 per cent. at body temperature) was used intrathecally and subcutaneously. Crawford and Fleming (1938) injected intrathecally, in 4 of their 10 cases, a solution which they estimated at 1 per cent. at body temperature. A sterile saturated solution in saline was prepared for me by Dr. J. E. McCartney and the solubility at room temperature was found to be just over 0·5 per cent. It would be necessary to inject 200 c.cm. of this solution in order to give 1·0 g. of the drug. This is inconvenient for subcutaneous injection, but the solution is useful for intrathecal injection of about 20 c.cm. at the first lumbar puncture. The amount so introduced, 100 mg., almost completely disappears within 24 hours, but by this time the requisite level in the C.S.F. should be obtained from the oral dosage.

TOXIC EFFECTS OF SULPHANILAMIDE

The only toxic effects observed were early cyanosis (within 24–36 hours) in varying degree in nearly every case, and a macular erythematous rash on the extensor aspects of the forearms and on the forehead in one case. The early cyanosis was not due to

sulph- or meth-hæmoglobinæmia. It appeared to have no harmful effect. It cleared rapidly as soon as the dosage of the drug was reduced. During the period of cyanosis the blood was actually dark in colour. This phenomenon was studied in seven cases by Marshall and Walzl (1937) who found that the iron content and the oxygen-carrying capacity of the blood in these cases were parallel. There was no evidence that the hæmoglobin function of the blood was affected. They suggested that it was a simple coloration of the blood due to unknown oxidation products of the benzene ring.

Blood counts, total and differential, were done in many cases and no damage to the granular series or other blood-cells was demonstrated. In two or three cases some normoblasts were seen in films. A polymorph leucocytosis of 16,000 to 50,000 was a constant feature of the acute stage and was apparently uninfluenced by the drug.

The following case, encountered early in the series, suggested that blood-urea might be increased. This was disproved conclusively by the outcome of the case itself and by examinations for blood-urea in many other cases :—

A man, aged 23 years, was admitted on Jan. 26th, 1938, on the tenth day of the disease. He had been treated in a general hospital for four days before admission with daily intrathecal and small intravenous doses of antimeningococcal serum and he had also been catheterised. Group I meningococcus was present in C.S.F. on admission. Combined antitoxin and drug therapy was given, but after 7·0 g. of sulphanilamide he became very cyanosed and the drug was stopped. The C.S.F. became sterile within 24 hours, but the man remained very ill and was still semicomatose after three days. The blood-urea was then found to be 300 mg. per 100 c.cm., and it mounted steadily to 500 mg. before death. He had been unable to pass urine from admission and the urethra contained pus. A catheter was tied in the bladder. Post mortem a most severe purulent and semigangrenous cystitis was found along with purulent ascending pyelonephritis. No remaining evidence of meningitis. Death was evidently due to the concurrent bladder and kidney infection. (Hence this case has been excluded from the series.)

TABLE IV—CASES TREATED WITH SERUM (INTRAVENOUS OR INTRAPERITONEAL) AND SULPHANILAMIDE

Age-group.	Cases.	Bact. group.			Not bact. verified.	Deaths.	Fatality-rate (per cent.).
		I.	II.	Inag-glutin.			
0–	10	2	5	1	—	1	10
1–	10	3	3	—	—	2	20
5–	19	7	1	—	1	Nil.	Nil.
20–	14	5	3	—	4	2	14
40–	3	2	1	—	—	1	33
50–	1	1	—	—	—	Nil.	Nil.
60+	2	—	—	—	—	1	50
Total	59	20	13	1	5	7*	11·8

* *Deaths*

1. Female aged 1. Admitted fourth day. Group II infection. C.S.F. sterile within 24 hours and child appeared to be recovering; but vomiting, dyspnœa, and gradual coma developed 2½ days after admission and she died 2 days later. Post mortem : thrombosis of superior longitudinal sinus with hæmorrhage into left frontal lobe.

2. Male aged 45. Severe fourth-day case with petechial rash. Group I infection. C.S.F. sterile within 24 hours. Became deeply comatose after a hypodermic injection of morphia gr. ¼ and died 2½ days after admission. Post mortem : œdema of brain and early broncho-pneumonia ; meningeal exudate cleared up.

3. Female aged 26. Severe case with purpuric rash. Group II infection. Sulphanilamide dosage after 24 hours, reduced to 3·0 g. daily. C.S.F. sterile from 24 to 72 hours, but thereafter meningococci gradually appeared and persisted till death. Sulphanilamide dosage probably too low (see Allott's note, Case 24).

4. Male aged 5 mths. Group II infection. C.S.F. sterile 24 and 48 hours after treatment commenced. Sulphanilamide stopped 3½ days after treatment. Meningitis recurred a few days later masked by symptoms of enteritis. Post mortem : extensive meningeal exudate. Period of drug treatment much too short (see Allott's note Case 1).

5. Male aged 2 yrs. 8 mths. Very acute second-day case with convulsions on admission. Group I infection. C.S.F. sterile in 24 hours. Fatal convulsions recurred after two days. Post mortem : meningeal exudate almost cleared up, only a few flakes remained.

6. Male aged 38. A dustman older than his years. Moderately severe fifth day case. Group I infection. C.S.F. sterile within 24 hours and remained sterile throughout, but under high pressure. Apparent recovery from acute stage but gradually developed hydrocephalus and died after 43 days. Post mortem : no meningeal exudate ; possible fine adhesions in region of tentorium. It is suggested that this is an instance of meningeal fibrosis, comparable to other forms of fibrosis in elderly people.

7. Male aged 62. Admitted fourteenth day of disease. C.S.F. sterile from admission. Slowly deteriorated and died after 66 days. Post mortem : some basal adhesions and hydrocephalus.

Details of the fifty-nine cases of Series II are shown in Table IV. As before, it was necessary to exclude some cases in order to evaluate the effect of treatment, but these were few since the general hospitals had now begun to transfer their cases promptly. The series includes every case admitted to the hospital during the period May, 1937, to May, 1938, except two cases recovering on admission, two acute cases admitted moribund (dying after 5 and 12 hours), one case admitted in the fifth week of the disease with basal block, the case just described, and the sixteen cases in Series III.

COMMENTS

(1) The rapidity of cure and the low fatality-rate were the striking features of this series. In all but a few cases the C.S.F. was free from organisms within 12–24 hours and remained so, and the cell count was reduced to less than 100 per c.mm. within three or four days. In five cases organisms were seen or cultured up to 48 hours and in two cases up to 72 hours (sulphanilamide dosage rather low). In one recovered case (Case 16 in Allott's note) and one fatal case (Case 3 under Table IV) in which the initial dosage was considerably below the standard or was reduced too soon, the C.S.F. was sterile in 24 hours but meningococci reappeared and persisted for many days. It appears to be important to maintain the high initial dosage for at least three days and *not to reduce it because of cyanosis.* Case 4 (Table IV) above indicates the need for continuing the drug (in reduced dosage) for some days after this initial period. The rapid reduction in the cell count of the C.S.F. suggests rapid cessation of the inflammatory reaction, and makes repeated lumbar puncture unnecessary. The possibility of an aftermath of chronic fibrosis and hydrocephalus is correspondingly reduced.

There were not a few instances of dramatic recovery from coma and delirium to normal cerebration within 48 hours. The period of amnesia seldom exceeded 8 hours from commencement of treatment. (Formerly under the intrathecal serum treatment amnesia

might last two or three weeks.) A recent example is quoted :—

A boy, aged 16, a powerful youth, was admitted on the fourth day of the disease with nuchal rigidity and right-sided facial and arm paresis; he was irritable and irrational. Cells in C.S.F. 6080 per c.mm. and meningococci Group I. Treatment with sulphanilamide (7·0 g. during 16 hours after admission). Coma then very deep: no response to strong stimuli, such as a sharp slap on the face; pupils insensitive to light; right hemiplegia. Resisted attempts at lumbar puncture. Under Evipan (3 c.cm. intravenously) and gas-and-oxygen, 80 c.cm. turbid C.S.F. removed. Serum (120 c.cm.) then given intravenously and sulphanilamide 1·75 g. four-hourly by nasal tube. Eight hours later stood up in bed and spoke and was able to swallow. Slept all night; next day quite rational but had slow cerebration. C.S.F. sterile; cells 160 c.cm. per c.mm. On the following day (60 hours from admission) he was quite recovered; normal temperature; rigidity very slight; C.S.F. sterile and cells 35 per c.mm.

Another striking case was that of a child aged 8 weeks admitted seriously ill on the seventh day with diarrhœa also present.

Lumbar puncture on admission yielded only 4 c.cm. of very purulent fluid; cells 72,000 per c.mm. and Group I meningococci. The C.S.F. was sterile within 24 hours and in 72 hours the cell count had fallen to 320 per c.mm. Rapid recovery from the acute stage. This infant had in convalescence a recurrence of severe enteritis with dehydration, but recovered and was discharged well.

(2) Thirty-three cases were typed; twenty were of Group I, thirteen of Group II and one inagglutinable. The treatment appeared equally effective with all these types. Only five cases were not bacteriologically verified, chiefly owing to rapidity with which the fluid became sterile under treatment. These were all definite clinical cases.

(3) Of the seven fatal cases, there were only three in which the meningitis did not clear up and in two of these the sulphanilamide treatment given was inadequate, in the light of subsequent knowledge. The other (Case 7, Table IV) was a late case. The remaining four deaths were due to incidental happenings, which were incapable of control. The fatality-rate for this series of fifty-nine cases is 11·8 per cent., and the series includes ten infants under 1 year with one death, and six cases over 40 years with two deaths.

(4) There was one relapse, in a man of 27 who was treated early in the series with the inadequate dose of 2·0 g. sulphanilamide daily. The relapse was treated with the standard dosage and subsided rapidly.

(5) The complications in recovered cases comprised one case of deltoid paresis, one with hemiplegia, and several with deafness. Recovery was complete except in two of the cases of deafness (males aged 8 and 17). The deafness was almost absolute.

(6) The pressure in the C.S.F. for a few days after admission showed considerable variation from case to case. In most severe cases it registered over 300 mm. of water for three or four days. Symptoms due to pressure were not obtrusive. About four daily lumbar punctures from admission were generally sufficient to gauge prognosis and check treatment. No special effort beyond this was made to drain the theca. This was not required when the fluid became sterile within 24–48 hours, and the cell count dropped to nearly normal levels within a few days.

Sulphanilamide Alone

Sulphanilamide, used alone, was a failure in the first case tried (A. B., aged 5 months, quoted above) probably because of inadequate dosage. It was decided to try it again after twenty cases had been treated by combined therapy. The next case also, however, was a failure possibly owing to age and intercurrent disease.

C. D., male aged 44 years. Severely ill with profuse purpuric rash. Group II infection, and associated chronic bronchitis, emphysema, arterio-sclerosis, and chronic otitis media. Sulphanilamide orally three days, 10·5, 7·5, and 6·0 g. respectively. Meningococci persisted in C.S.F. Antitoxin 120 c.cm. intravenously was then given; the drug was stopped for two days and then resumed in smaller dosage, without effect. From the fifth day of treatment acute bronchitis was prominent till death a week later. Post mortem: early glomerular nephritis; diffuse fine multilobular cirrhosis of liver; traces of meningeal exudate, with positive culture. (This case has been excluded from Series III owing to the severe intercurrent disease.)

Although the above case was a severe test and the dosage may have been on the low side, no further attempt was made to use the drug alone in treatment until adequate experience had been gained of the dosage which was required and could be tolerated. Recently, armed with the whole experience of Series II, I have treated sixteen selected cases of whom fifteen recovered rapidly and one entered the chronic stage, has now hydrocephalus and will probably die.

This last case is that of a boy of 2, who suffered from enteritis as well, and the diagnosis was not made until about the tenth day of the disease. The dosage was 3·0 g. daily, but the drug was not taken very well and the C.S.F. sulphanilamide level was less than 4 mg. per 100 c.cm. until after 48 hours. The C.S.F. was sterile after 72 hours and remained so for four days when meningococci reappeared and persisted. The cause of the failure may have been partly delayed diagnosis and treatment, and partly low dosage.

The cases in Series III were consecutive admissions, except for two very severe cases, which because of their severity were treated with serum in addition and therefore have been placed in Series II. The age-grouping was rather favourable: 1–2 years, five cases; 5–20 years, five cases; 20–30 years, five cases; 40 years, one case. The clinical grouping was: mild, five; moderately severe, nine; severe, two. The bacteriological grouping was eight in Group I; five in Group II; two not typed and one not bacteriologically verified. Although this last patient, aged 24, had serum intrathecally and intramuscularly before admission, he still had a cell count of 18,000 per c.mm. in the C.S.F. and was sharply ill on admission. Accordingly he has been included in Series III, although he might be considered a case of combined therapy. Similarly, a woman of 40, with a Group II infection, had had large amounts of an antibacterial serum intravenously during the three days before admission, and also 10 c.cm. of Type II serum intrathecally; but since meningococci were still cultured from the C.S.F. up to 24 hours after admission, she has been included in Series III. Of the fifteen bacteriologically verified cases, the C.S.F. was free from organisms within 16 hours in eleven of them, and within 40 hours in the remaining four. The fluid in all cases except the one failure cleared within a few days and remained sterile.

COMMENT

This small series of sixteen cases, with fifteen recoveries, suggests that sulphanilamide alone in adequate dosage by mouth is, in clinically favourable cases at least, a rapid and potent remedy. The

clinical evidence is so far insufficient to determine whether it is justifiable to use it without serum in all cases, or in selected cases only. The available experimental evidence is in favour of combined serum and drug therapy. Thus Brown (1937) found in mice that administration of sulphanilamide and serum simultaneously produced a greater degree of protection than either of the agents by itself. Similarly Branham and Rosenthal (1937) found with three of ten strains in mouse infections the drug was more effective, with four of the strains serum was more effective, and in the remaining three there was no appreciable difference. Further, in four strains in which neither agent alone gave a high proportion of cures, combined drug and serum gave much better results. In three of these the effect of the combination was greater than the additive effect of drug and serum therapy alone.

Nevertheless I have been increasingly impressed by the possibilities of sulphanilamide therapy alone. It is, I consider, clear that the "first-aid" treatment of choice in future, as soon as the diagnosis is made, should not be intrathecal serum but adequate dosage of sulphanilamide by mouth. This may be supplemented by intrathecal injection of saturated sulphanilamide solution. If any serum is given it should be a large intravenous or intraperitoneal dose (e.g., 100 c.cm.), not intrathecal. The case should be transferred at the earliest possible moment to the care of the person responsible for its treatment to a termination.

Summary

1. The treatment of 113 sporadic and seasonal cases of acute meningococcal meningitis is described. All other cases admitted during the period, but excluded from the series, are recorded.

2. In 38 cases treated with large doses of serum intravenously, combined with intrathecal serum twice daily during the first five days, the fatality-rate was 16 per cent. There were no infants in this series. The method was relatively difficult and laborious, and the nursing complicated for several days. The cerebro-spinal fluid was usually sterile within 24–48 hours, but in about a fifth of the cases contained meningococci for four or five days, or occasionally longer.

3. In 59 cases including 10 infants treated with both serum and sulphanilamide, the fatality-rate was 11·8 per cent. Recovery was very rapid and the nursing relatively easy, the cerebro-spinal fluid being usually sterile within twenty-four hours. The few exceptions to this rule, as well as 2 of the 7 deaths, could be explained on the basis of low dosage of sulphanilamide.

4. In 16 selected cases of favourable age-grouping treated with sulphanilamide alone, there were 15 rapid recoveries.

5. The age-period 5–20 years is the most favourable. Amongst 113 cases there were 36 in this age-group without a death.

6. Sulphanilamide therapy marks an important advance. It has changed the treatment of meningococcal meningitis from a difficult to a relatively simple matter. The former high case-mortality in infants appears to be yielding to this treatment. It is effective in Group II as well as in Group I infections. High initial dosage is advocated. The sulphanilamide level in the cerebro-spinal fluid should preferably reach 5 mg. per 100 c.cm. in twenty-four hours and be maintained at this level for three days. Early cyanosis is not an indication for reducing dosage. The treatment is probably effective only in the acute stage. Two cases treated after the tenth day of the disease died.

7. Experimental and clinical evidence so far is in favour of combined serum and drug therapy, especially in severe cases. This appears to be effective both in Groups I and II infections, and in certain anomalous types. Further experience with sulphanilamide alone in adequate dosage is desirable.

8. Serum should be given in one or two large doses intravenously or intraperitoneally; given thus, a fraction of it penetrates rapidly to the cerebro-spinal fluid and is maintained therein in small amount for many days.

9. Drainage is seldom required apart from daily lumbar punctures for two or three days.

The sulphanilamide (Streptocide) used in this investigation was kindly supplied by Messrs. Evans Sons Lescher and Webb Ltd., through the therapeutic trials committee of the Medical Research Council. The pathological work and photography were done by the Southern Group Laboratory, and the biochemical work at the Group Laboratory, Lewisham Hospital, L.C.C.

I have to thank various medical colleagues for able assistance in the management of the cases; Dr. McCartney and Dr. Burtenshaw for carrying out the serological investigation; and Dr. Allott for the extensive and valuable biochemical work. The London County Council are not to be held in any way responsible for any opinions expressed in this communication.

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SULPHANILAMIDE CONTENT OF CEREBRO-SPINAL FLUID

DURING THE TREATMENT OF MENINGOCOCCAL MENINGITIS

By E. N. Allott, B.M. Oxon., F.R.C.P. Lond.

PATHOLOGIST, L.C.C. GROUP LABORATORY, LEWISHAM HOSPITAL

In connexion with Dr. H. S. Banks's investigation of the treatment of meningococcal meningitis with sulphanilamide, a large number of determinations of the sulphanilamide in blood and cerebro-spinal fluid (C.S.F.) have been made. These were made by Marshall's original method (Marshall, Emerson, and Cutting 1937); it was felt desirable to complete the observations by the same method throughout, rather than to change to the new method (Marshall 1937) which was published while this work was in progress.

An abstract of the findings in 36 cases in which fairly complete observations were made is given in the accompanying Table. The sulphanilamide content of the C.S.F. towards the end of the first 24 hours, by which time an effective concentration has usually been reached, is recorded in each case, and a further value at a later period is shown in most cases. In many cases the concentration takes several days to reach a maximum, the sulphanilamide dosage being kept constant. For example, one patient aged 7, who received 1·0 g. every four hours, showed values of 4·1, 4·6, 10·0, and 26·8 mg. per 100 c.cm. on successive days. After the first few hours the sulphanilamide concentrations in the blood and C.S.F. are usually very similar, but during the early hours, while the concentration is rising, the sulphanilamide content of the blood is always very much higher than that of the C.S.F.; one or two examples are shown in the Table.

There is very considerable variation in the speed with which an effective value is reached, and in the eventual level maintained in different patients on equivalent dosage; two particularly striking examples are quoted in Dr. Banks's paper. This variation is presumably due more to differences in the rates of excretion in different subjects than to a variation in the permeability of the meningeal barrier, as the blood-sulphanilamide level shows similar variations. The values obtained are of the same order as those recorded by Crawford and Fleming (1938); they are on the whole lower than those found by Marshall, Emerson, and Cutting (1937) for similar dosage in normals; it is possible that the administration of large amounts of fluid to the patients may have led to increased loss through the kidneys.

TABLE SHOWING CONCENTRATION OF SULPHANILAMIDE IN CEREBRO-SPINAL FLUID REACHED IN FIRST 24 HOURS, AND MAXIMUM VALUE DURING THE FIRST FEW DAYS OF TREATMENT

Case No.	Age.	C.S.F. sulphanilamide. Mg. per 100 c.cm.	Hours after first dose.	Total to date (g.).	Mg. per 100 c.cm.	Days after first dose.	Sulphanilamide dosage (g. per day) and remarks.*
1	5 m.	5·2	18	2·5	9·3	1½	3·0. Died.
2	9 „	5·2	14	2·0	7·4	7	3·0, later 2·0
3	10 „	3·5	17	2·5	10·7	1½	3·0
4	1½ yr.	5·0	17	2·5	13·2	1½	3·0
5	1½ „	4·0	15	2·0	6·6	1½	3·0
6	2½ „	2·0	19	2·5	4·0	2½	3·0
7	4 „	4·9	20	2·5	6·1	3	3·0
8	4 „	8·0	22	3·25	10·7	2	4·5
9	5 „	1·8	17	3·75	3·8	1½	4·5. No serum.
10	5 „	10·5	17	5·0	19·5	2½	6·0
11	5 „	8·5	24	3·75	9·7	3	4·5
12	7 „	3·8	24	6·0	5·0	3½	6·0
13	8 „	4·8	11	3·0	7·5	1½	6·0
14	8 „	2·2 (Blood 5·9)	10	2·25	4·9	1½	4·5
15	8 „	2·6 (Blood)	17	5·0	4·1	2½	6·0
16	15 „	0·8	17	7·0	4·9	7	9·0, later 6·0 and 3·0
17	15 „	1·2 (Blood 4·1)	19	5·0	2·0	1¾	6·0
18	15 „	0·6	10	3·0	1·9	1½	6·0
19	17 „	2·5 (Blood 4·6)	18	8·0	6·5	2½	9·0
20	18 „	0·8	19	5·0	5·1	2½	6·0
21	21 „	1·6	16	7·5	5·4	1½	9·0
22	22 „	4·1	18	8·5	9·5	4	9·0, later 6·0
23	23 „	2·3	15	6·0	11·8	2½	9·0. No serum.
24	26 „	2·8	15	6·0	3·4	1½	9·0. Died.
25	26 „	2·0	24	9·0	4·2	1½	9·0, later 6·0
26	28 „	3·5	18	7·5	3·0	1½	9·0, later 6·0
27	28 „	3·2	19	8·5	5·0	1½	9·0
28	28 „	9·2	26	12·5	—	—	10·5. No serum.
29	28 „	2·9	18	10·0	5·1	2½	12·0, later 6·0. No serum.
30	29 „	2·9	23	6·0	—	—	6·0
31	38 „	7·2	22	7·5	—	—	9·0
32	39 „	3·3	20	4·0	—	—	6·0
33	45 „	2·8	13	7·0	4·3	1½	9·0. Died.
34	47 „	2·5	21	6·0	4·7	1½	6·0
35	55 „	4·9	17	5·0	6·4	1½	6·0
36	61 „	2·0 (Blood 4·3)	17	5·0	4·0	2½	6·0

m. = months; yr. = years.
* Serum was also given in all cases, except where noted.

Notes

Case 1. Sulphanilamide was stopped 3½ days after treatment commenced. In spite of high concentration during this early period, meningitis then recurred, masked by enteritis.

Case 16. Patient eventually recovered, but sterility of the C.S.F. was obtained much more slowly than in patients with a higher sulphanilamide level.

Case 18. In spite of the persistently low sulphanilamide level, a normal and rapid recovery took place.

Case 24. Sulphanilamide dosage reduced to 3·0 g. per day after 24 hours. C.S.F. sulphanilamide fell to 1·3 mg. per 100 c.cm. on third day; meningococci reappeared and persisted.

Case 33. Post-mortem examination showed acute purulent bronchitis with œdema of lungs, cirrhosis of liver, and acute glomerulonephritis. Exudate, with meningococci, was still present.

There is very considerable variation in the speed with which an effective value is reached, and in the eventual level maintained in different patients on equivalent dosage; two particularly striking examples are quoted in Dr. Banks's paper. This variation is presumably due more to differences in the rates of excretion in different subjects than to a variation in the permeability of the meningeal barrier, as the blood-sulphanilamide level shows similar variations. The values obtained are of the same order as those recorded by Crawford and Fleming (1938); they are on the whole lower than those found by Marshall, Emerson, and Cutting (1937) for similar dosage in normals; it is possible that the administration of large amounts of fluid to the patients may have led to increased loss through the kidneys.

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TREATMENT OF PNEUMONIA WITH 2-(*p*-AMINOBENZENESULPHONAMIDO) PYRIDINE

BY G. M. EVANS, M.D. Birm., M.R.C.P. Lond.
AND
WILFRID F. GAISFORD, M.D., M.R.C.P. Lond.
PHYSICIANS TO DUDLEY ROAD HOSPITAL, BIRMINGHAM

THE natural corollary to the valuable experimental work by Whitby (1938) on the treatment of pneumococcal infection in mice with M. & B. 693 was its trial in clinical medicine. As soon as it had been ascertained that the drug could be given with safety to healthy human beings and that moderate doses were well tolerated and free from untoward effects, opportunity was afforded us of trying its effect in a series of patients suffering from pneumonia.

From March to the middle of June of this year more than 200 cases of lobar pneumonia were admitted to Dudley Road Hospital, Birmingham. About half of these were treated with M. and B. 693, the others, admitted to the wards of our colleagues, serving as controls and receiving the usual routine non-specific treatment. Admissions to each group occurred for the most part on alternate days. This paper records our findings in 100 of these cases, unselected except that 3 patients dying within twenty-four hours of admission have been excluded, since in these the drug did not have a fair trial. A corresponding selection was made in the control group. The diagnosis in every case was based on a characteristic history and unequivocal signs of lobar consolidation. X ray confirmation was obtained in many, and rusty sputum and the presence of herpes lent additional evidence in several more.

It is difficult to assess impartially the results of treatment in pneumonia other than by consideration of the case-mortality rate. The dramatic improvement which may occur at the crisis tends to focus undue attention on the treatment being employed at that time. Many new methods of treatment when first employed appear to meet with success, but this is not always substantiated by experience. The striking fall in mortality following the use of M. & B. 693 has, however, led us to publish this paper now in the hope that our findings may be confirmed.

METHOD OF ADMINISTRATION AND DOSAGE

M. & B. 693 is made up in 0·5 g. tablets and is given by mouth. The tablets have a faintly bitter taste which is, however, insufficient to cause nausea. They are insoluble but may be crushed and given in suspension or may be swallowed whole.

At the beginning of this investigation, when the clinical effects were unknown, small doses were given. For the first five weeks, when approximately 60 per cent. of the cases were admitted, the average dose was 1 tablet four-hourly for 3 to 4 days, followed by 1 tablet twice daily for a further 2 or 3 days, giving an average total of 12 g. Later on, larger initial doses were given and careful watch was kept on the blood picture, frequent white cell counts being made. When it became apparent that there was no tendency to the development of granulopenia many of these counts were discontinued and it was decided to administer large doses during the 72 hours immediately following admission, the routine being to give 2 g. (i.e., 4 tablets) statim, and 1 g. four hourly thereafter, making an average total intake in the later cases of about 25 g. In a few cases this dosage was exceeded and a maximum of 9 g. has been given in the first 24 hours, with beneficial result. It was found that with this method the temperature and toxic symptoms, especially delirium, subsided more rapidly.

Cyanosis appeared in about a quarter of the intensively treated patients, but disappeared promptly when the drug was withdrawn. Spectroscopic examination of the blood revealed the presence of methæmoglobin in 6 of these cases. There was no sulphæmoglobinæmia.

Except in two cases (41 and 70), no special treatment was given in addition to the M. & B. 693, beyond such sedatives as were necessary to ensure adequate rest. Case 41 was venesected, 450 c.cm. blood being withdrawn with prompt relief. Case 70, who persistently refused all fluids, was given an intravenous dextrose-saline without effect.

INCIDENCE AND MORTALITY

The *age* of patients ranged in both treated and control cases from 8 to 68 years. The *sex*-incidence was 61 per cent. males and 39 per cent. females in the treated series, and 67 per cent. males and 33 per cent. females in the control series. *Typing* of the pneumococcus from the sputum was attempted in all cases in which sputum was available and gave the following results: Type I, 28; Type II, 8; Type III, 3; Group IV, 5. In the remainder it was impossible to identify the type. Such small numbers are insufficient for correlating the mortality figures with the type, but further work on this is being done. *White blood-cell counts* were made in 54 cases. At the beginning the counts were made irregularly throughout the period of treatment, but when the giving of larger doses became a routine practice, counts were made immediately on admission to the ward, again 4 hours later, and thereafter at 12 or 24 hour intervals.

Although the virulence of the pneumococcus may vary from year to year, and from one season to another, yet the case-mortality rate appears to remain fairly constant. Thus Joules (1933), in a survey of 497 cases from Selly Oak Hospital, Birmingham, found a gross rate of 25·6 per cent. (20·6 per cent. excluding cases that died within 36 hours of admission). Davies, Graham-Hodgson, and Whitby (1935) found a rate of 19 per cent. in their series of 859 cases from the Middlesex and Royal Free Hospitals, London.

The case-mortality rates at Dudley Road Hospital have been investigated for the past two years and give the following figures. From January to April, 1937, 195 cases of lobar pneumonia were admitted giving a rate of 25·6 per cent. From January to March this year 136 cases were admitted with a case-mortality rate of 30 per cent., giving an average combined rate of 27·8 per cent., very similar to the figure obtained in the present control series (Table I). Davies, Graham-Hodgson, and Whitby point out that all observers have noted the great increase in mortality with age and that if the selection of cases be limited to those between 10 and 40 years of age, the rate is considerably reduced (to 8·6 per cent. in their series and 12·5 in Joules's). In our series it is reduced from 8 per cent. to 3 per cent., and in the controls from 27 per cent. to 16 per cent. Of the 8 fatal cases 6 died during the first few weeks of this investigation when we were giving small doses (an average of 3 g. daily) and we now consider such small dosage inadequate in severe cases. Furthermore, 4 of these were suffering from pre-existing complications. In the control series a third of the deaths occurred in the first five weeks and two-thirds in the following six weeks, which suggests that there was no diminution in the spontaneous virulence of the epidemic (see below).

The severity of the disease has been depicted in the protocols by the traditional one, two and three plus signs. It is interesting that there were 26 per cent. "three plus" cases, which approximates closely to the generally accepted case-mortality figure. Of these 26 cases 19 survived. The age-incidence is given in Table I:—

TABLE I.—CASE-MORTALITY RATE

TREATED CASES

Age in years—	8–19	20–29	30–39	40–49	50–59	60 and over.	Total.
Cases ..	31	20	18	13	13	5	100
Deaths ..	1	0	1	2	3	1	8

CONTROL CASES

Cases ..	25	19	24	22	6	4	100
Deaths ..	1	5	5	9	4	3	27

DETAILS OF THE EIGHT FATAL CASES

In the first five weeks when small doses of M. & B. 693 (average 3 g. daily) were in use 6 deaths occurred. Of these cases 2 were given the larger doses at present considered to be adequate.

CASE 6 was a man of 45 admitted on the fourth day of illness with consolidation at the left base. Group IV pneumococci were present in the sputum. The initial white blood count (W.B.C.) was 19,400

SAMPLE OF PROTOCOLS (EVERY FIFTH CASE)

No.	Sex.	Age.	Lesion.	Day of illness.	Degree of illness.	Temp. fell: day of illness.	Pre-existing complications.	Dosage. Method.	Dosage. Total (g.).	Effects.	Complications of pneumonia.	Result.
1	M.	28	RUL	4th	+	7th	..	0·5 g. q.q.h., 3 days.	7·5	Normal course.	..	Cured.
6	M.	45	LLL	4th	+ + +	Low intermittent T. until death	..	1 g. on admission; 2·5 g. daily, 3 days.	8·5	..	..	Died.
11	F.	51	RLL	5th	+ + +	6th	Chronic nephritis.	0·5 g. q.q.h., 4 days.	10·5	..	..	Died.
16	M.	51	RLL	8th	+	9th	Chronic bronchitis.	0·5 g. q.q.h., 3 days; 0·5 g. t.d.s., 1 day.	7·5	Prompt response in 12 hours.	..	Cured.
21	F.	12	LLL	4th	+ +	..	..	1 g. q.q.h., 5 days; 0·5 g. q.q.h., 1 day.	36	Cyanosis (methæmoglobinæmia).	Staph. empyema L. base; drained 18th day.	Cured.
26	M.	42	R→LUL	4th	+ + +	7th	..	0·5 g. q.q.h., 4 days; 0·5 g. b.d., 1 day; 1st course.	9·5	W.B.C. fell to 4200 during 1st course;	Appeared to be dying with 2nd area of pneumonia until dosage increased on 10th day after admission.	Cured.
								0·5 g. t.d.s., 3 days; 0·5 g. q.q.h., 5 days; 0·5 g. b.d., 1 day; 2nd course.	18	rose steadily during 2nd course.		
31	F.	17	LLL	7th	+ + +	..	Syn-pneumonic empyema.	0·5 g. q.q.h.	36	..	..	Died.
36	F.	21	RLL	6th	+	7th	..	0·5 g. q.q.h.	9	Prompt response in 24 hours.	..	Cured.
41	M.	57	RUL	4th	+ + +	T. raised irregularly for 16 days.	In extremis on admission.	0·5 g. q.q.h.	36	..	Spread to LLL. Temporary glycosuria controlled by insulin, 10 units b.d.	Cured.
46	M.	33	LLL	2nd	+	3rd	..	0·5 g. q.q.h.	6	Prompt response in 24 hours	..	Cured.
51	F.	32	LLL	4th	+	8th	..	0·5 g. q.q.h.	15	Normal course.	..	Cured.
56	M.	44	LLL	3rd	+ +	5th	..	0·5 g. q.q.h.	12	Normal course.	..	Cured.
61	M.	57	LLL	4th	+ +	..	..	0·5 g. q.q.h.	8	..	Advanced myocarditis.	Died.
66	F.	14	LLL→LUL	2nd	+ + +	4th	..	1 g. q.q.h., 3 days; 0·5 g. q.q.h., 1 day.	20	Dramatic response.	..	Cured.
								0·5 g. q.q.h., 3 days.	9			
71	M.	43	LLL	2nd	+	4th	..	1 g. q.q.h., 7 days; 0·5 g. q.q.h., 4 days.	45	693 contd. for 10 days as spike of T. on 3rd day.	..	Cured.
76	F.	18	LLL→apex.	3rd	+ +	9th	..	1 g. q.q.h., 7 days; 0·5 g. q.q.h., 2 days.	47·5	..	Lung collapse.	Cured.
81	M.	24	L. apex.	4th	+ +	5th	..	1 g. q.q.h., 3 days; 0·5 g. q.q.h., 2 days.	26·5	Response in 24 hours; cyanosis.	..	Cured.
86	M.	25	RLL	2nd	+ +	4th	..	2 g. stat., then 0·5 g. q.q.h.	42	Prompt response in 36 hours.	Resolution delayed for 2 weeks.	Cured.
91	F.	67	RLL	3rd	+ + +	4th	..	2 g. stat., then 1 g. q.q.h.	6	Prompt response in 24 hours.	..	Cured.
96	M.	21	LLL	1st	+	3rd	..	2 g. stat., then 1 g. q.q.h.	20	Prompt response in 36 hours.	..	Cured.

OTHER CASES REFERRED TO IN TEXT

19	M.	18	RLL	2nd	+	4th	..	0·5 g. q.q.h., 4 days; 0·5 g. b.d., 2 days.	12	Response in 48 hours.	..	Cured.
32	F.	65	LLL	8th	+ + +	9th	..	0·5 g. q.q.h.	12	..	Empyema; chest aspirated on 18th day and staph. pus withdrawn. Spont. absorption.	Cured.
35	M.	40	RLL	4th	+ + +	9th	Bronchitis.	0·5 g. q.q.h.	12	..	Signs of fluid R. base with rise of T. after 3 weeks. Spont. absorption.	Cured.
37	M.	28	LLL	1st	+ +	4th	..	0·5 g. q.q.h., 4 days; then b.d. 12 days.	24	..	Empyema (sterile pus). Spont. absorption on 14th day.	Cured.
70	M.	55	LLL	4th	+ + +	T. persisted.	Heavy smoker; ? alcoholic; chronic bronchitis.	1 g. q.q.h., 5 days.	27	693 appeared to have no effect.	Delirium. Tympanites.	Died.

q.q.h. = four hourly.

and three days later was 24,200. Low intermittent temperature continued till the patient died six days after admission. The total dosage of M. & B. 693 was 8·5 g. in four days. Permission for post-mortem examination was not granted.

CASE 11 was a debilitated woman of 51 admitted on the fifth day of illness with pneumonia at the right base. The W.B.C. was 28,200; no sputum was obtained. The urine contained a cloud of albumin and granular casts. The patient's temperature fell from 102° F. to normal in 36 hours without any reduction of toxæmia. The total dosage of M. & B. 693 was 10·5 g. in four days. The patient died five days after admission. Post mortem the R.L.L. showed red hepatisation and fibrinous exudate over the pleura. The L.L.L. showed patchy broncho-pneumonia, greyish in colour. The coronary arteries were atheromatous and the kidneys showed chronic nephritis.

CASE 12 was a man of 44 who was admitted on the eighth day of his illness with consolidation at both bases. He gave a history of chronic bronchitis since being gassed in the war. Group IV pneumococci were found in the sputum. The initial W.B.C. was 8400 and five days later it was 22,000. The patient's temperature fell from 99·8° F. to 97° F. in 36 hours, without any improvement in the general condition; slight jaundice developed on the day after admission. The patient received 9·5 g. of M. & B. 693 in five days. He died six days after admission. No P.-M.

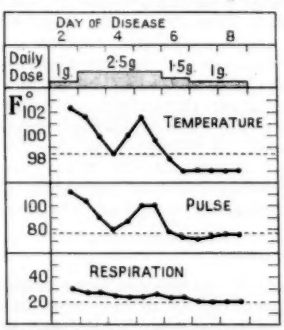

FIG. 1 (Case 19).—Secondary pyrexia. Admitted April 23rd.

CASE 13 was a man of 61 who was admitted on the eighth day of his illness with consolidation of the R.M.L. He gave a history of chronic bronchitis for ten years and had marked arteriosclerosis. No sputum was obtained. The W.B.C. was 6000. He received 9 g. of the drug in four days. His temperature remained unsettled and he died on the fourth day in hospital. No P.-M.

CASE 31 was a girl of 17 who was admitted on the eighth day of a L.L.L. pneumonia and who had a syn-pneumonic empyema. Hæmolytic staphylococci and pneumococci were cultured from the pus. The patient received 36 g. of M. & B. 693 which had no apparent effect and death occurred thirteen days after admission. Post mortem a pyopneumothorax and underlying consolidation at the left base were shown.

CASE 61 was an obese man of 57 who was admitted on the fifth day of a L.L.L. pneumonia complicated by myocarditis and chronic bronchitis. He died on the seventh day after 8 g. of M. & B. 693 which had had no effect. No P.-M.

CASE 68 was a woman of 39 admitted on the fourth day of illness with consolidation at both bases. Type II pneumococci were found in the sputum. The initial W.B.C. was 10,500 and there was no increase in the first week after which it rose to 31,000 and 27,000 in the second week. The toxæmia and remittent temperature continued till the patient died on the nineteenth day after admission. She had received a total of 51 g. of M. & B. 693 in nine days. Post mortem, resolving pneumonia at both bases and small scattered staphylococcal abscesses were shown.

CASE 70 was a man of 55 admitted on the fourth day of illness with Type I pneumonia at the L.L.L. and who had had chronic bronchitis for eight years.

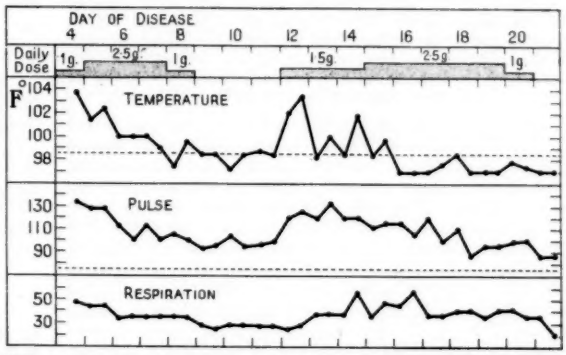

FIG. 2 (Case 26).—Spread from right upper lobe to left upper lobe on twelfth day. Admitted March 29th.

The daily W.B.C. were 8100, 13,800, and 21,000. Blood culture was sterile on the day before the patient died. He continued febrile and delirious until death five days after admission. He received 27 g. of M. & B. 693 in five days, but did not respond to treatment. Post mortem the L.L.L. showed red hepatisation with a central grey area. Early pneumonia was present in the upper half of the R.L.L.

EFFECTS OF THE DRUG

The concentration which M. & B. 693 attains in the blood and its subsequent fate in the body are problems outside our scope, but they are under investigation elsewhere. The effects of the drug on the temperature, the white blood-cells, and the incidence of complications were studied. There was no evidence of renal damage as determined by routine examination of the urine and post-mortem findings.

Temperature.—Table II shows the day of illness on admission to the hospital both of the treated cases and of the controls. It will be seen that they

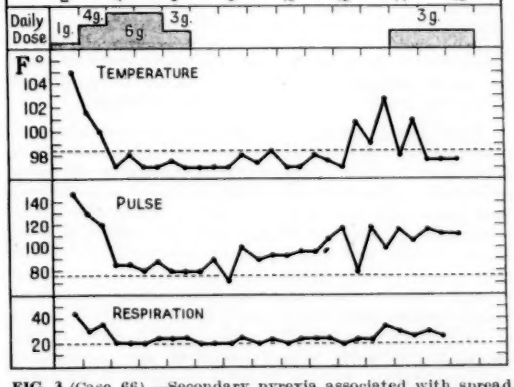

FIG. 3 (Case 66).—Secondary pyrexia associated with spread of disease from left base to left apex. Admitted April 26th.

are fairly comparable. Table III shows the day of disease on which the temperature fell.

Table II and Table III (the latter referring only to those patients who survived) should be read in conjunction with the following figures showing the

number of cases in which the temperature fell within 24 and 48 hours of admission to hospital.

Among the treated cases the temperature in 37 fell within the first 24 hours and in a further 23 in the next 24 hours, making a total of 60 in which the temperature fell within 48 hours. Among the controls, the temperature in 16 fell in the first 24 hours and in 18 in the second, making a total of 34 in which the temperature fell within 48 hours.

Thus, taking into consideration the similarity of the two series in Table II, and making allowance for the crisis to be expected in any lobar pneumonia, the treated cases showed a distinct advantage over the controls. The fall of temperature was in most cases accompanied by diminution of toxæmia and in those patients with delirium the sensorium cleared rapidly. It did not, however, take the place of a normal crisis, being less dramatic and followed by a more gradual clinical improvement. When small doses of M. & B. 693 were being employed, it was found in some cases that the temperature, having become normal for one to three days, rose again. Fig. 1, from Case 19, is an illustration. In a few other cases this secondary pyrexia was accompanied by a spread of the pneumonic process. Thus Case 26, a patient with a right upper lobe pneumonia, developed a left upper lobe involvement on the twelfth day (nine days after admission) (Fig. 2). In Fig. 3 the secondary pyrexia is shown occurring eleven days after admission in Case 32 and associated with a spread from the left base to the left apex.

TABLE II

Day of illness on admission	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	—
Cases treated	2	17	21	28	10	11	4	7	0	—
Controls ..	6	8	31	25	13	7	5	3	2	—

TABLE III

Day of illness on which temp. fell..	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	Later
Cases treated	0	1	11	18	14	11	14	4	8	11
Controls ..	0	1	2	6	11	9	13	6	7	17

Whatever the explanation of these anomalies may be, since resorting to larger doses of M. & B. 693 no further such cases have been encountered.

White blood count.—No case of granulopenia was observed. In 3 cases the counts fell to below 5000, a point of no evil prognostic significance as all three recovered. The highest count obtained was 58,000 and there were two of over 40,000: these also made a normal recovery. There was no evidence that M. & B. 693 had any constant effect on the white cells; high counts before the crisis fell rapidly after it and those which were slightly raised remained nearly stationary. One case in the control series showed a fall from 13,000 on the third to 1100 on the eleventh day with almost complete agranulocytosis and was fatal. In the treated series 4 fatal cases showed low initial figures, rising slowly with successive counts. One patient (Case 26) showed a fall from 12,000 to 4200 in two days and then developed further consolidation during the second week. In this second attack, similarly treated with M. & B. 693, the white blood count remained apparently unaffected, giving counts of 17,900 and 15,900. He ultimately recovered (see also Fig. 2).

Table IV shows some of the serial counts obtained in the later cases when the large doses were being employed; the figures are not significantly different from those observed in the control cases.

TABLE IV

Case	64	88	92	95	97	99
W.B.C. before treatment ..	33,000	11,400	18,500	13,900	12,400	28,100
After 4 hours—i.e., 2 g. of M. & B. 693	35,800	14,900	17,500	10,300	12,400	44,300
After 24 hours ..	18,200	11,100	15,000	26,400	6,900	30,800
„ 48 „ ..	16,350	17,300	11,550	16,000	5,800	39,100
„ 72 „ ..	24,100	22,400	—	—	4,800	—

Complications encountered were the cases of secondary spread previously mentioned, 2 cases in which resolution was delayed for two weeks, 2 cases of pulmonary collapse, and 6 of empyema. Of the empyemas 2 were pneumococcal (both Type I), 3 grew *Staphylococcus aureus*, and 1 was sterile. The incidence of empyema was higher than in the control series in which there was only 1. It was also higher than the average figure of 2–3 per cent. given by Osler. We have no explanation to offer either for the number of empyemas or the high incidence of staphylococcal infection.

Of the empyema cases 2 (Nos. 37 and 32) absorbed spontaneously after a single diagnostic aspiration; one of these was staphylococcal and the other sterile. Of the others 3 were drained and recovery ensued. The sixth (Case 31) had a syn-pneumonic empyema and died. Culture of the pus showed *Staphylococcus aureus* and pneumococcus. A further case (No. 35) showed X ray evidence of fluid at the right base which was absorbed gradually without aspiration.

The protocols of the 100 cases treated are available for inspection.*

SUMMARY

The results of treatment of 100 cases of lobar pneumonia with M. & B. 693 are given. The case-mortality rate was 8 per cent. as compared with 27 per cent. in a control series observed at the same time.

Addendum

RESPIRATORY INFECTIONS IN CHILDREN

M. & B. 693 has also been used in the children's wards in cases of pneumonia, broncho-pneumonia, otitis, and upper respiratory infection.

The cases of broncho-pneumonia treated numbered 40, with 2 deaths. Both of these, girls of 4 and 5 years old respectively, also had pneumococcal peritonitis. One infant, aged 1 year, with broncho-pneumonia, who developed whooping-cough and was too ill to be transferred to the fever hospital, responded in twenty-four hours to 0·25 g. four-hourly. The youngest patient treated was 6 weeks' old. The others were all comparatively mild cases; consequently it is too early yet to form an opinion as to the place M. & B. 693 may take in the treatment of pneumococcal infections in infancy. There was no difficulty in getting any of the babies to take the tablets, which were crushed and suspended in milk or glucose-saline, nor was there any vomiting or diarrhœa afterwards. No toxic manifestations were observed.

* The protocols will be issued with the reprints of this article.—ED. L.

The ease of administration and the abolition of the necessity for any injections make the drug particularly adapted to the requirements of pædiatrics.

Table V gives the dosage which may be employed according to age.

TABLE V

Age ..	1–3 mth.	6 mth. to 1 yr.	2 yr.	3 yr.	5 yr.
Dose in tablets (t.)	¼ t. 4-hrly.	½ t. 4-hrly.	¾ t. 6-hrly.	1 t. 6-hrly.	1 t. 4-hrly.

In severe cases an initial double dose may be given if necessary—e.g., to a child of 3, the first dose might be 2 tablets, followed by 1 tablet six-hourly.

We are indebted to Dr. F. W. Ellis, medical superintendent of the hospital, for permission to publish these cases; to our colleagues for access to their wards and case records; to Dr. William Whitelaw and his staff for the pathological findings; and to Dr. W. R. Thrower for his help during the course of the investigation and for suggestions as to dosage of the drug. Messrs. May and Baker kindly provided a constant supply of the tablets and gave us every facility for the preparation of this paper

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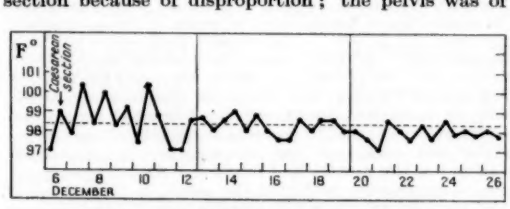
RUPTURE OF A CÆSAREAN SCAR
TREATED BY SIMPLE DRAINAGE AND FOLLOWED BY PREGNANCY

BY HUMPHREY ARTHURE, M.B. Lond., F.R.C.S. Eng., M.C.O.G.
OBSTETRIC REGISTRAR AT CHARING CROSS HOSPITAL

MANY cases of ruptured Cæsarean scars have been reported, but it is an accident that still merits attention if its incidence is to be materially reduced. The following case is of interest in that it gave an opportunity for studying the condition of the uterus two years after the rupture, which was treated by simple drainage.

CASE-HISTORY

The patient was a woman of 31. Her *first pregnancy* in 1934 was terminated by a Cæsarean section because of disproportion; the pelvis was of



Temperature chart after Cæsarean section in 1934.

the "high assimilation" type, with a contracted outlet. The classical operation was performed using a longitudinal incision in the body of the uterus. The placenta was lying anteriorly, and a live male child weighing 8 lb. 2 oz. was delivered. The uterine incision was sewn up with catgut in three layers: a continuous suture in the decidua to close the uterine cavity, a series of deep mattress sutures in the myometrium, and a continuous suture for the peritoneal coat. After closing the abdomen the cervix was dilated digitally to allow free drainage of the lochia. The abdominal wound healed satisfactorily, but there was a moderate degree of pyrexia, with a maximum of 100·4° F., for four days after the operation.

In the *second pregnancy* in 1936 it was intended to perform a repeat Cæsarean at term, but at the 36th week the patient was admitted to hospital because of slight antepartum hæmorrhage. Whilst she was in the ambulance there were very vigorous fœtal movements (? expulsion of fœtus into the peritoneal cavity), but on admission no fœtal movements could be felt and the fœtal heart could not be heard. The fœtus was lying obliquely with the head in the left iliac fossa; this was confirmed by radiography, but Spalding's sign was absent. At no time did the patient show signs of shock or complain of pain. As there was no recurrence of the hæmorrhage she was discharged eight days later at her own request.

Two months later, about the 44th week of pregnancy, she was readmitted and stated that no further fœtal movements had been felt. Radiography now confirmed that the fœtus had died and medical induction was therefore attempted; this failed and surgical induction was carried out with bougies. A week later the cervix was dilated under an anæsthetic and the bougies removed; the membranes were then ruptured and some purulent discharge came away. On culture this showed a mixed growth of staphylococci, *Streptococcus viridans*, and diphtheroid bacilli. Although the woman had previously been afebrile, her pulse-rate and temperature rose after this operation and her general condition steadily deteriorated. A fortnight later it was decided to perform a laparotomy. Lying in front of the ruptured uterus a gestation sac was found which chiefly consisted of omentum and contained a decomposing fœtus in purulent fluid. The fœtus was removed and two large drainage-tubes were inserted into the peritoneal cavity. The placenta was left in situ and the uterus was not disturbed. Convalescence was remarkably uneventful and the patient left hospital after five weeks with the abdominal wound almost healed.

The *third pregnancy*, which was in the present year, occasioned the patient such mental anxiety that immediate termination was considered, and this was in fact carried out on March 11th, the abdominal route being used because it was thought that the pregnancy might be partly or wholly extra-uterine. On opening the abdomen fairly extensive adhesions to the parietes were found. The uterus contained a three months' gestation, and there was but a single adhesion of omentum attached to the right side of the fundus and upper part of the body. When this was separated the peritoneal surface of the uterus was seen to be intact. Hysterotomy and sterilisation were performed. The anterior wall of the uterus was carefully examined, but there had been such complete union that it was difficult even to recognise the actual site of rupture. Sections of the scar are unfortunately not available because the uterus was not removed.

DISCUSSION

The ætiology of rupture of a Cæsarean scar has been exhaustively studied by Eardley Holland (1920) and others, who have shown that sepsis is the most important factor. In the present case there was little evidence of sepsis after the original Cæsarean section (see Figure), but Holland has shown that sepsis may be present with only slight fever. The use of catgut instead of inabsorbable suture material has also been blamed, because of the rapid absorption which takes place in the involuting uterus. The low incidence of rupture (4 per cent.) compared with the frequency with which this suture material is used makes it

unlikely that this is a factor of much importance. Often there is also some exciting cause of the actual rupture in a subsequent pregnancy, and a retro-placental hæmorrhage is suggested in this case by the earliest symptom, vaginal loss.

Failure of diagnosis in this particular case may be partly excused by the extremely slight symptoms at the time of rupture, but Holland has pointed out that this is not at all unusual with ruptured scars, since only thinned avascular fibrous tissue gives way. Incidentally the distinctive feel of the fœtal parts free in the peritoneal cavity was noted, but its significance was not appreciated.

Most examples of rupture of a Cæsarean scar which have been reported have been treated either by hysterectomy or by repair of the tear. In Holland's series of 97 cases only 2 were treated by simple drainage, and no further pregnancies were reported in these or similar cases as far as can be ascertained by a brief survey of the literature. Pregnancy in a uterus with an unrepaired rupture therefore appears to be unique. It is possible that such pregnancies may have occurred in the era before Sanger introduced suture of the uterine incision (1882), but it is unlikely that many patients survived the Cæsarean operation under these conditions. It is perhaps interesting to recall the earliest recorded section performed on a living woman, where Jacob Nufer operated successfully upon his own wife after she had been given up by the midwives and barbers in attendance. It is usually stated that she had five subsequent pregnancies which terminated normally and spontaneously. The present case substantiates this story, which has usually been explained by assuming that Nufer operated for a full-term extra-uterine gestation.

The chief interest of the case described here lies in the fact that it was possible to examine the uterus after rupture, in the gravid state. Two observations stand out as remarkable, first, that so few adhesions were found and second, that the peritoneal coat of the uterus had been so neatly repaired by nature. Whitridge Williams (1917) has studied the cicatrix in 10 uteri subsequently removed by Cæsarean hysterectomy, and has shown that perfect healing may result in complete muscular regeneration, leaving no trace of scar tissue except on the peritoneal surface. Thinning of the scar of varying degree is however fairly common, and usually the thin scar is composed chiefly of fibrous tissue with a certain proportion of muscle-fibres scattered through it, the main bulk of the uterine muscle having failed to unite. Although the specimen in this patient was not available for section, it was thought that there had been some muscular union, but even so the scar would almost inevitably have given way under the increasing tension if the pregnancy had been allowed to proceed to term.

For permission to publish this case I must thank Dr. Everard Williams under whose care the patient was admitted, but I must also state that he did not perform the laparotomy which terminated the second pregnancy.

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SHEFFIELD VOLUNTARY HOSPITALS APPEAL.—Mr. S. C. Goodwin has given £10,000 to the Sheffield Voluntary Hospitals Million Pound Appeal Fund, and the money has been set aside to help in building the proposed new hospital in Glossop-road, which will work in close coöperation with the university.

THE EMERGENCY BED SERVICE

THE Voluntary Hospitals Emergency Bed Service has been in existence a fortnight. The intention of the organisers was to prevent any possibility of over-pressure in the early days, and to this end they sent letters to doctors in batches rather than all at once. In consequence the number of calls received has so far been small—about 45 in the first week—and well within the capacity of the staff.

The working of the service has been smooth and there has been little delay in finding beds. In several cases arrangements have been completed within five minutes of the doctor's inquiry, but these cases did not need ambulances, and the usual time taken has been some ten to fifteen minutes. It has been found that the hospitals have 300–400 beds vacant at any given moment, or about 3 per cent. of their total complement, and this number should be quite enough to deal with as many emergencies as are likely to arise.

As an example of the saving of time effected, a doctor in south-east London wished to get a patient with a perforated gastric ulcer admitted and tried three hospitals before ringing up the emergency service. The indicator board in the central office showed that the three hospitals had no beds available but one was found in a fourth hospital in six minutes. By ringing the service in the first place the doctor might have saved himself three telephone calls and much time and annoyance.

Now that the experimental period is over there is no reason why any doctor, either in London or the country, should hesitate to make full use of the facilities offered. Country doctors, who will receive no official notification, should make a note of the telephone number, for it will not appear in the directory; it is Metropolitan 8781. The service is at work from 8 A.M. to 10 P.M. on weekdays and from 9 A.M. to 10 P.M. on Sundays and bank holidays.

THE LANCET 100 YEARS AGO

June 30th, 1838, *p.* 485.

From a report to the Medico-Botanical Society on the notorious quack liniment of St. John Long.

Dr. Macreight called the attention of the Society to the composition of the lotion employed by the notorious St. John Long, which, at one time, excited no small controversy with respect to its imputed virtues. It was known to most of the members, that at the death of that person who, like Paracelsus of old, died with a bottle of his elixer-vitæ at his bed side, the secret of the composition was sold for £10,000. The present proprietors had now exposed it for sale, and it was in the power of any person to examine it. He (Dr. M.) assisted by his friend Mr. Fownes, had analysed it with some care, in Mr. Everitt's laboratory, and the result was, that it consisted of oil of turpentine, and acetic acid, held in suspension by yolk of egg. . . .

He had employed the liniment pretty extensively during the last month, and found the results consequent on its application perfectly the same as from Long's. The phenomena which followed the use of either one or the other, which were deemed miraculous by the votaries of quackery, and paradoxical by many of the medical profession, were, in his opinion, easily explicable on pathological principles . . . when a discharge had been established a cabbage leaf was applied over the surface, and this, in many respects, is superior to a common cataplasm, which is clumsy and dries up rapidly; but of course no regular practitioner would employ cabbage leaves while the simple and elegant contrivance, lint covered with oiled silk, was within his reach.

MEDICAL SOCIETIES

ST. JOHN'S HOSPITAL DERMATOLOGICAL SOCIETY

ON June 22nd, Prof. Charles Flandin delivered the Prosser White oration at 1, Wimpole-street, W., with Dr. W. N. Goldsmith, the president, in the chair. The subject of the address was

Recent Advances in Leprosy

with special reference to the methods adopted for dealing with the problem in France.

Prof. Flandin thought that the time was ripe to bring before British dermatologists the present position of leprosy, as summed up at the recent congress of the International Leprosy Association held at Cairo, and to draw their attention to conditions in France, which might have considerable interest for this country. The recorded amount of leprosy in any country depended very largely on the effort expended in ascertainment, but there were certain disquieting features in the present situation in Europe which might lead to a reconsideration of our attitude to the whole problem. Although it was almost a law that leprosy declines as social and hygienic standards rise and although the great leprologists of the last generation had declared that they had never or hardly ever come across leprosy of indigenous origin in Western Europe during the whole of their lives, yet Prof. Flandin had found in the short space of three years ten cases in Paris, none of which had ever left France. He referred to the discovery of indigenous cases in England by Dr. J. M. H. MacLeod and stated that in certain other European countries, notably Rumania, the disease was said to be greatly on the increase.

In his clinic at the Hôpital Saint Louis he had been able to make some exact observations of the incubation period and had been surprised to find a certain number of cases in which that period was comparatively short. In soldiers, officials, and others who returned from countries in which leprosy was endemic the disease might appear at an interval of from six months to twenty years, but in some of the indigenous cases the incubation period was less than six months, in one case apparently as little as two months. Moreover he was convinced that the first objective sign of leprosy by no means denoted the beginning of infection. "Leprous fever," a continued fever with pains especially round the joints, was nearly always noted before the actual development of the lesions. Such persons had undoubtedly been infected and were in a state of allergy, as could be shown by a non-specific reaction following the injection of tuberculin. The intradermal injection of chaulmoogra oil would attract Hansen's bacilli to the site of the injection and a definite diagnosis could be obtained by demonstrating them in it after about an eight-day interval. The site of election from which to obtain bacilli was undoubtedly the lobule of the ear.

As to treatment, he had seen many methods come and go but he had considerable hopes of a colloidal preparation of cholesterol and chaulmoogra esters which was given intravenously daily in doses of about 10 to 15 c.cm. Treatment was recommenced at the first sign of a relapse, but he thought that it might be better to continue treatment after all signs had disappeared on the analogy of the arsenical compounds in the treatment of syphilis.

Commenting on administrative methods, he expressed his conviction that the compulsory notification in force in France was useless. The leper would change his name and run the risk of prison rather than expose himself to the possibility of being shut up in a leprosarium. As in tuberculosis, the examination of family contacts was essential, but this was impossible through official machinery. The education of the public was perhaps the most important need. They must be taught that only prolonged and intimate contact as in family life was dangerous and that leprosy could be regarded as less contagious than tuberculosis and at least equally amenable to treatment. Meanwhile he pleaded for close coördination between the specialists of England and France interested in the subject in order that, first, some ascertainment of the real numbers might be made, and secondly that such action as might be needed should be the result of the experience of both countries pooled in a "front commun de la lèpre."

DEVON AND EXETER MEDICO-CHIRURGICAL SOCIETY

AT a meeting of this society held on May 26th Dr. CRICHTON MACGAFFEY gave an address entitled

Type Reactions of the Kidney to Disease

The classification and nomenclature of renal disorders, he said, has been a source of controversy and perplexity ever since Bright's disease was first described. Bright's original description was itself confusing, in that it embraced more than one variety of kidney disease. Volhard and Farr in 1914 did much to clear the issue, and Van Slyke materially advanced our knowledge by the introduction of his urea-clearance test. Roper in 1926 laid stress on the changes that take place in the albumin content of the blood where there is much œdema.

It is now possible to include all the varieties of renal disease under three type reactions—degenerative, hæmorrhagic, and hypertensive.

The *degenerative* type includes all those cases in which albuminuria is the prominent feature, such as chronic parenchymatous nephritis or nephrosis. Although the tubules are sometimes severely damaged, there is reason to believe that the kidney is not the primary focus of disease. There is in fact a prerenal deviation of salt and water causing their retention with resultant œdema, and the albumin found in the urine comes, in the first instance, not from the kidney but from the blood stream. When albumin in the blood stream falls from the normal 4·3 per cent. to 2·7 per cent., œdema appears. Further proof of this prerenal deviation is afforded by experiment. For example, large draughts of normal saline do not cause diuresis; egg albumin, intravenously injected, appears in the urine as such even when the kidneys are normal; intravenous saline causes diuresis, but not if an artificial acidosis is produced as a result of temporary ischæmia; indeed all the symptoms of uræmia follow if the experiment is pushed to its limits. This explains the perplexing normal renal function often met with in nephrosis and also the fact that mercurial poisoning, which primarily affects the tubules, does not cause œdema until the glomeruli are damaged.

The *hæmorrhagic* type, both acute and chronic, is a true nephritis, in that the blood-cells in the urine denote active renal damage, the main brunt of the disease falling on the glomeruli. In the acute

form the usual recovery of the patient is due to the glomeruli undergoing periodic systole and diastole. Only those glomeruli in action at the time are affected by the toxins, presumably streptococcal in nature and allergic in character; but those glomeruli are permanently destroyed, leaving scars in their places. In the subacute or chronic form, red cells are still to be found in the urine, provided the urine is examined when freshly passed and when concentrated, since the usual dilute urine met with in these cases is apt to hæmolyse the blood-cells. This type of kidney conforms accurately with the renal test and here the clinical picture agrees with the pathological findings. The urea-clearance test of Van Slyke provides an admirable means of estimating renal damage. Whereas a normal kidney can produce a very dilute or very concentrated urine, a kidney in which many glomeruli have been destroyed will still produce a normal urine, but the range of function will be limited. The tubular portion of the nephron (renal unit) is damaged in these cases, because the blood-supply to the tubule is mainly the efferent vessel from the glomerulus, the anastomotic branch from the glomerular efferent vessel being insufficient for the needs of the tubule. The damage to the tubule is secondary to that of the glomerulus. It may be understood now how the original conception of uræmia—i.e., urine in the blood—was more accurate than the later conception of urea in the blood.

The later stages of the chronic hæmorrhagic nephritis always entail hypertension with ultimate uræmia. Hæmorrhagic retinitis is seen only with hypertension; indeed "hypertensive retinopathy" might be a better term for it.

The *hypertensive* type is represented by those cases in which the initial lesion is in the intima of the arterial blood-vessel. The recognition of such a type explains the sometimes unexpected normal blood-urea of patients who, on clinical grounds, might be thought uræmic. These people always have a high blood pressure and in general practice are met more often than the uræmic. The later stages of the hypertensive type so closely resemble those of chronic hæmorrhagic nephritis that differentiation may be impossible.

EDINBURGH OBSTETRICAL SOCIETY

AT a meeting of this society on May 11th, with Prof. JAMES HENDRY, the president, in the chair, Dr. T. N. MACGREGOR read a paper on

Œstradiol Benzoate Therapy in Senile Vaginitis

He recorded a clinical and photographic study of 15 cases of senile vaginitis, an inflammatory condition of the vagina characteristically associated with post-menopausal life. All the patients had had a normal or artificial menopause. The symptoms complained of in order of frequency were: vulvar irritation and vaginal discomfort, vaginal bleeding, dysuria, leucorrhœal discharge, and dyspareunia. The diagnosis was based on visual and speculum examination of the vulva and vagina; the characteristic features were redness round the vaginal introitus, areas of petechial hæmorrhage scattered over the vagina, and narrowing of the vaginal vault. Uterine carcinoma was excluded by curettage when there was a history of bleeding. As a result of treatment 8 patients were completely cured and had remained symptom-free for periods varying from 14 to 21 months. Of the rest 7 were relieved in that they were almost symptom-free, but evidence of some inflammation still remained. Of these cases 1 was a diabetic and 2 had an associated leukoplakic condition of the vulva.

The rationale of œstradiol benzoate therapy in senile vaginitis was the restoration of the atrophic-vaginal epithelium to that condition which existed during the period of reproductive life. The reconstitution of the vaginal epithelium by the œstrogens not only made the tissue more vascular and thus promoted healing, but the increase in the cellular structure subjacent to the denuded areas caused shedding of the infected tissue. Œstrogenic therapy also stimulated the production and deposition in the vaginal epithelium of nutritive substances necessary for a normal vaginal flora, which, once re-established, proved inimical to the invading organisms. Cessation of therapy was followed, after a time interval, by a reversion of the vaginal epithelium to the atrophic condition which normally existed after the menopause. The main form of treatment was the intramuscular injection of œstradiol benzoate, supplemented in 2 cases by vitamin A. The dosage varied from 5 mg. bi-weekly to 10 mg. daily according to the severity of the condition and the response obtained. Intramuscular injection was the most successful mode of administration. Œstradiol in the form of suppositories had proved disappointing, possibly because the atrophic state of the vagina prevented absorption of the œstrogens. Suppositories might, however, be useful after the vaginal epithelium had been rejuvenated by intramuscular administration.

ROYAL SOCIETY

Prof. A. N. RICHARDS, who holds the chair of pharmacology at Philadelphia, delivered the Croonian lecture of the Royal Society of London on Thursday last, his subject being

Processes of Urine Formation

He began by pointing out that controversies over the nature of renal function have largely resulted from lack of information about the composition of urine at different stages of its elaboration within the structural units of the kidney. The discovery that the kidneys of amphibians and of reptiles can be subjected to direct microscopic observation during life indicated a way of obtaining such information. Microdissection methods, as developed by Barber, Kite, and Chambers, have made possible the collection of minute specimens of fluid from Bowman's capsule and from various levels of the uriniferous tubules. Quantitative analyses of these specimens show that with respect to every constituent for which an analytical method could be devised the fluid as separated from blood plasma in the glomerulus has the composition of a protein-free plasma filtrate. The blood pressure in the capillaries of individual glomeruli has been measured and found to be significantly higher than the colloid osmotic pressure of the plasma. Hence the conclusion seems inescapable that the glomerular process in these animals is physical filtration.

Analyses of fluid collected from the tubules have shown that the glucose of the glomerular filtrate is restored to the blood during passage through the proximal convolutions; chloride is reabsorbed, and the reaction is changed from alkaline to acid, by the cells of the distal convolutions. Reabsorption of water takes place in both sections of the tubule, but more in the distal than in the proximal.

Reasons for thinking that the conclusions drawn from these experiments are applicable to the

mammalian kidney have been derived from study of the excretion of the polysaccharide inulin by dogs and rabbits. The results show that this substance, which, after intravenous injection, is excreted rapidly and in high concentration in the urine, finds access into the urine solely through the glomerulus. From the amount of inulin excreted in unit time and its concentration in plasma, a minimal rate of glomerular filtration can be calculated. Such calculations show that in non-diuretic dogs the volume of glomerular filtrate is more than a hundred times as great as the volume of urine elaborated from it and is sufficient to contain all the constituents of urine normally excreted, with the exception of those that are formed within the kidney (ammonia and hippuric acid).

These experiments, said Prof. Richards, support the view that the excretory function of the kidney is accomplished at the expense of energy derived from the heart, and that the work which the cells of the kidney perform consists in the selective restoration to the blood, against osmotic gradients, of those substances whose loss would disturb the constancy of the fluid environment of tissue cells. Such constancy is essential for survival.

REVIEWS AND NOTICES OF BOOKS

The Biology of Pneumococcus

By BENJAMIN WHITE, Ph.D., with the collaboration of ELLIOTT S. ROBINSON, M.D., Ph.D., and LAVERNE A. BARNES, Ph.D. New York: The Commonwealth Fund; London: Humphrey Milford, Oxford University Press. 1938. Pp. 799. 20*s*.

As part of the pneumonia study carried on during the years 1931 to 1935 by the Massachusetts Department of Public Health under a grant from the Commonwealth Fund, three publications were planned. The first, "Lobar Pneumonia and Serum Therapy," appeared in 1936 and has recently been republished; this volume is the second; and the third on "Pneumonia with special reference to Pneumococcus Lobar Pneumonia" is in preparation. This book by the late Dr. Benjamin White and his associates at the Massachusetts Antitoxin and Vaccine Laboratory is described as a review of all the literature on the bacteriological, biochemical, and immunological characters of pneumococcus; the claim is ambitious, but the statement that "this work will stand as the critical summary of all contributions from earliest discoveries to the present" can be endorsed.

The seventeen chapters vary in interest. The first, a history of pneumococcus, seems to settle an old controversy in giving the honour of first proving the association of pneumococcus with lobar pneumonia to Friedländer and not to Fraenkel. In subsequent chapters on the biology, biochemistry, classification, dissociation, pathogenicity, chemical constituents, antigenicity, &c., of the pneumococcus, the evolution of our knowledge is critically traced with the minimum of repetition. Chapters specially noteworthy are those on the chemical constituents of pneumococcus, showing the way in which the fascinating puzzle of the capsular polysaccharides was gradually pieced together by Avery, Heidelberger, and other workers, and on the production of antipneumococcic sera in horse and rabbit. The authors stress the need for international standardisation of the unit of pneumococcus antiserum and urge the use of an in-vitro precipitation method, using standard preparations of the specific polysaccharides, in preference to the biological mouse-protection test with a standard serum.

Some misinterpretation of the facts occasionally occurs; for example, in the description of the methods for rapid typing (p. 128) it is suggested that Armstrong's method is a modification of Sabin's slide-agglutination technique whereas, in fact, Armstrong, and independently Logan and Smeall, were the first to apply the Neufeld *quellung* phenomenon to the identification of the pneumococcus directly from sputum. However, Griffith gets full credit for his original work on pneumococcal dissociation and change of type and the early work of Washbourn and Eyre is given due prominence. Brief chapters on pneumococcal infections in man and on serum therapy are included, though these matters will be fully described in the forthcoming volume. In an appendix of 40 pages methods for growing, isolating, and typing pneumococcus, the preparation of the specific polysaccharides, serological tests, and the methods in use for testing the potency of therapeutic antisera are set out. There are 1593 references and a full index.

That a book of this size could be written round a single coccus must amaze the layman, but the more initiated reader will be filled with admiration for the authors in undertaking the task and genuine pleasure at its completion in so masterly a fashion.

Van Nostrand's Scientific Encyclopedia

London: Chapman and Hall. 1938. Pp. 1234. 50*s*.

THIS well-produced and compact volume contains much information on the various basic sciences; it also covers medicine, engineering, and aeronautics. The entries, of which there are some ten thousand, are arranged alphabetically and are for the most part definitive and brief. So far as can be judged nothing is conceded to merely popular exposition; the level of accuracy is very high. The general arrangement and the cross-reference system are excellent; we would have welcomed references to more detailed expositions but doubtless these would have taken up too much space. The illustrations are abundant and clear. When submitted to an arbitrary test the encyclopædia gave satisfactory information on the following items: diazo compounds, shearwater, television, archæopteryx, Fitzgerald contraction, carotene, tench and Cepheid variable; it failed however on fishing cat, Rift Valley, and sago, and some of the entries, particularly on mathematics, are so terse and technical that they would be of doubtful help to anyone not already familiar with the subject. This is, of course, an almost inevitable defect in any reference book at once accurate and condensed It would be hard to find a more useful book of its type.

Radiology of Pulmonary Tuberculosis

By J. E. BANNEN, M.B., Ch.B., D.M.R.E., Hon. Radiologist, Hull Royal Infirmary. London: Baillière, Tindall and Cox. 1937. Pp. 156. 12*s*. 6*d*.

THE use of radiology in the study of pulmonary tuberculosis has steadily increased of recent years and many practitioners in this country must feel the need of clear, concise, and authoritative notes on the interpretation of radiograms. Up to a point Dr. Bannen gives them what they need; he covers the ground without excessive detail and provides many

illustrations. These are reproduced as reduced negatives and thus have the advantage of more closely resembling X ray films than the positives with which most books are illustrated. Unfortunately in the process of reproduction much detail is lost and certain illustrations, such as those showing early infiltration at the apices, are not clear enough to be of much value to a reader anxious to learn to recognise the disease in an early stage. The custom of printing reduced films of whole chests to illustrate original articles should not, perhaps, have been followed in a book whose object is to teach the elements of radiological interpretation. For this purpose portions of lung fields on a larger scale would probably be more effective.

Structural Variations of the Human Iris and Their Heredity

With special reference to the Frontal Boundary Layer. By VIGGO ESKELUND, M.D. London: H. K. Lewis and Co. 1938. Pp. 242. 21*s.*

THE laws of inheritance of blood groups and types are now so well established that in certain cases paternity can be definitely excluded. Dr. Eskelund believes that the various patterns of iris found in man could also be classified on a hereditary basis and eventually perhaps provide equally good or even better evidence on paternity. In a laborious study of photographs of the living iris in 154 subjects, conducted under the auspices of the P. Carl Petersen Foundation at the University of Copenhagen, he has arrived at certain preliminary conclusions which will interest without convincing most of his readers. He postulates a combination of certain characteristics in each eye which together make up a recognisable type of iris. These are not easy to differentiate until one realises that his terminology must be translated into common English usage before his thesis can be assessed. For example, his "frontal boundary layer" is what we are accustomed to call the anterior layer and his "scratches" are small crypts. The photographs are beautifully reproduced but it would be easier to follow the suggested classification if Dr. Eskelund had used a higher magnification in examining the eye before photographing it. The fact that there is some hereditary factor influencing iris pattern is a matter of common agreement; to what extent its apparent vagaries can be systematised to serve any medico-legal purpose must remain doubtful until many more people of different races have been examined.

Nelson Loose-Leaf Surgery

Renewal pages. New York and London: Thomas Nelson and Sons.

The latest renewal pages of this system are concerned with the treatment of cancer and appendicitis, and the surgery of the spleen. Walton Martin writes on surgical infections, performing a difficult task with some distinction; his contribution is entertaining to read and quite up to date. Lenz and Haagensen's article on the treatment of cancer has the merit of calling attention to certain aspects of the question, such as the natural immunity of the body, which are often glossed over or not even mentioned in the current text-books, though every shrewd clinical observer is well aware of their importance. The section on radiotherapy is also worthy of particular note, giving a well-balanced view of what can be expected from this method of treatment. Roger Vaughan provides an ordinary straightforward account of appendicitis and the same may be said of the revised article on the surgery of the spleen by Reznikoff, McGowan, and Pool, which has the merit of being concise, whereas most of the other contributions are rather diffuse. It would be a great pity if this tendency were to spread to other parts of this splendid system of surgery, for one of its merits is to provide means for quick reference.

Aids to Bacteriology

Sixth edition. By WILLIAM PARTRIDGE, F.I.C., late Public Analyst, County of Dorset and Boroughs of Poole and Penzance. Revised by H. W. SCOTT-WILSON, B.Sc., B.M., B.Ch. (Oxon.), Director of the Laboratories of Pathology and Public Health, London. London: Baillière, Tindall and Cox. 1938. Pp. 300. 5*s.*

THIS unpretentious little volume has now, under the editorship of Dr. H. W. Scott-Wilson, reached a sixth edition. It represents a remarkable feat of condensation and contains as much information as many more ambitious and expensive books. The treatment of bacteriology is severely practical and the style of presentation is systematic. It is particularly orientated from the hygienic standpoint and students of public health will find it a reliable outline of the subject.

A Biological Approach to the Problem of Abnormal Behaviour

By MILTON HARRINGTON, M.D., Psychiatrist, Institution for Male Defective Delinquents, Napanoch, N.Y.; formerly Consultant in Mental Hygiene, Dartmouth College. Lancaster, Pa.: The Science Press Printing Company. 1938. Pp. 459.

IN a previous volume Dr. Harrington has destructively criticised the theories based on psycho-analysis and in the present book he sets forward the psychology that he would offer in its place. The greater part of the work is devoted to an account of the elementary principles believed to underlie normal behaviour, and in a final section the problem of abnormal behaviour is also discussed. Dr. Harrington's psychology is frankly mechanistic and he accepts no explanations which are not based fundamentally on physiological conceptions. Physiology certainly fails to bring us the whole way in matters psychological, but Dr. Harrington tries to prove that it brings us as far as we can safely go. Though his theories are eclectic rather than original, he avoids the historical method and makes sparing reference to the opinions of others. It is evident that he has been much influenced by the writings of William James and of William McDougall and by the work of such psychological physiologists as Head and Sherrington. In this book he has comparatively little to say against psycho-analysis except by implication. His point of view would be allowed by the average biological reader to be as strictly scientific as the subject permits. If his book has the fault common to many psychological writings of being somewhat wordy, the author must be credited with exceptional clarity and with the power of using apt illustration and instructive analogy. If the sections on psychopathology seem less satisfactory than those on normal psychology this may be partly due to the greater complexity of the subject; but it is likely that nearly all modern readers have assimilated too much of the Freudian point of view on this subject to appreciate one which completely ignores its contribution. Those who seek a theory of behaviour which can be kept in some sort of line with the rest of biological thought will find it in this book.

THE LANCET

LONDON: SATURDAY, JULY 2, 1938

THE POOR COUNTRYMAN

No need is more pressing in England to-day than to raise the status of the farmworker. The conditions of life for him and his family, never very high, have been deteriorating. For the most part he is housed in a cottage whose effective structural life has passed, and whose sanitary equipment is nil. His wage, though often augmented by having his cottage free of rent, and occasionally by the allowance of a daily quart of milk, remains too low for the proper feeding of more than one or two children. Little wonder that so many of the more enterprising should have left the land.

The reasons for this disturbing situation mostly arise from the peculiarities of the agricultural industry. In the first place the farmworker has to be housed near the farm, and here the onus of providing accommodation has fallen largely upon the farmer. Low rateable values have not encouraged the local rural authority to undertake the kind of building operations that a neighbouring urban power has found less onerous. The low rate of wage has added to this difficulty by emphasising the need to maintain a low rental. A worker, indeed, who has found it hard to keep his family in a "tied" cottage may be in worse trouble when transferred to a council cottage with a rental at least double. Even the regulation of the Milk Marketing Board operates against him, both in ensuring an increased flow of milk to the town and in stipulating a fixed price for its purchase; thus the impression received from a dietetic survey in a country district is that the children of the cowman get less milk than those of almost any other worker. It will also be realised that the farming industry has found itself unable to pay those rates of wage that other industrial concerns have attained. The farm labourer's basic wage [1] remains at 34*s.* 3*d.* a week and that of cowmen, stockmen, and shepherds at 39*s.* 3*d.*, and although this sum must be considered enough for a single worker, it seldom suffices for a family before the eldest child begins to add to the income. BROCKINGTON [2] found that a cowman earning 39*s.* 3*d.* a week, with the addition of a wife's earnings of 10*s.*, spent 31*s.* upon the food of his six children, of which 13*s.* went on bread. Since in this case no free milk was supplied, the housewife elected to spend 2*s.* 6*d.* on tinned milk. Had she preferred to buy liquid milk she would have obtained with this sum at the market price 1¼ pints daily, and each member of the family would have got seven tablespoonfuls. The same investigation showed that nearly three-quarters of the children in four rural schools in West Sussex were living in families where the expenditure upon food represented a diet below the British Medical Association (1933) standard; and in families where the farm wage was less than 40*s.* only 15 per cent. rose above this level.

In the past these facts have permitted of little remedy, mainly because of cost. Any effective attempt to tackle either improper housing or inadequate feeding has seemed to make excessive calls upon the local ratepayer. Much has been done in many areas under the Housing of Rural Workers' Act (1926), which provided a substantial subsidy, to improve old cottage property; but in the building of new houses, which has had no special subsidy, the country lags behind the town. County councils have likewise hesitated, although empowered, to set up necessary machinery for providing meals in schools (except perhaps in central modern, or grammar schools), since the cost of school canteens has appeared prohibitive. They have contented themselves, mainly in respect of elementary schools, with furthering the Milk Marketing Board's scheme for providing milk; and though this has done much to increase the consumption of milk among rural children, it leaves much to be desired.

Until this year in fact little was done to raise the standard of living of the farmworker, and it is to be hoped that the Housing (Financial Provisions) Act, 1938, which subsidises the erection of new houses at rentals below 3*s.* or 4*s.* (exclusive of rates), will make a new and good beginning with what the Minister of Health [3] last week called "the most important task in England to-day." The provision of a decent dwelling at a small rental is a first essential, and we must see that further legislation soon ensures that the necessary work of the English countryside shall be done without cost to the health and future health of its children.

THE FACIAL NEURALGIAS

OF all the various forms of pain affecting the face, the most outstanding in its severity and relentlessness is that known by the various names of trigeminal neuralgia, tic douloureux, or trigeminal tic. Characterised by the brevity as well as by the intensity of its attacks, this violent pain would be quite unendurable but for the complete intermissions between the painful spasms, though sometimes these intervals may be as short as only two or three minutes. The attacks are liable to be brought on by light peripheral stimuli such as wiping the face or blowing the nose, or the facial movements of eating, talking, or laughing. Unless the type of painful attack conforms to these standards the diagnosis of trigeminal tic must be held as doubtful, and the case should be classed

[1] Agricultural Wages (Regulation) Act 1924: rates as from April 11th, 1938.

[2] Brockington, C. F., The Influence of the Growing Family upon the Diet in Urban and Rural Districts, *J. Hyg., Camb.* 1938, **38**, 40; see *Lancet*, 1938, **1**, 444.

[3] Mr. Walter Elliot, addressing a conference of rural district councils' representatives at Shrewsbury on June 21st.

amongst the atypical neuralgias; though it is important to remember that some selected cases among these may be cured by the same operative or injection methods as are such well-proven agents in the treatment of the paroxysmal form.

Peripheral nerve divisions proved so unsatisfactory owing to the short period of relief given to victims of trigeminal tic that operations on the Gasserian ganglion were undertaken in order to provide a permanent cure. ROSE in 1890, followed next year by VICTOR HORSLEY, and shortly by HARTLEY in America and KRAUSE in Germany, and other workers, gradually demonstrated its success in giving relief, though the mortality was high owing to the risk of hæmorrhage from the cavernous sinus adherent to the ganglion. Next came improvements in technique by CUSHING, and, following a suggestion made by SPILLER in 1901, by FRAZIER in Philadelphia, who practised subtotal resection of the sensory root behind the ganglion, sparing the inner ophthalmic fibres to safeguard the cornea in the large majority of cases in which the ophthalmic division is not affected by the neuralgia. About the same time it was found that the motor root could be spared, with avoidance of the facial deformity from muscular wasting above and below the zygoma. This operation has been the standard surgical procedure for the past twelve years or more. On the other hand, following the introduction in 1903 of SCHLÖSSER'S method of deep alcohol injections of the main trigeminal branches at their foramina of exit from the skull, numberless practitioners have used this method with more or less temporary relief; and since 1912 HARRIS in this country and HÄRTEL in Germany have perfected the method of injection of the actual ganglion itself through the foramen ovale, by which in large numbers of cases cures as permanent as those by nerve resection can be obtained. Quite recently [1] HÄRTEL has reviewed the subject of 25 years' injection treatment of the ganglion, while from Stockholm has come a further advance in the surgical technique of the open operation. OLOF SJÖQVIST, a junior colleague of Prof. H. OLIVECRONA, published in January of this year [2] a new method of dividing the pain fibres of the trigeminal root without abolishing tactile sensibility, and with no danger of damage to the motor root. The operation is done posteriorly to expose and raise the cerebellar hemisphere and thus to bring into view the medulla, when an incision about 3·5 mm. in length and of the same depth is made in the side of the restiform body at the level of the middle of the olive and the vagus fibres. This incision divides the descending spinal root of the trigeminal nerve, and is named tractotomy. The rationale of the operation is comparable to a certain extent only with the spinal operation of chordotomy, in which the ascending spinothalamic tract, carrying pain and temperature sensations from the opposite lower half of the body, is divided so as to cure persistent pain in malignant pelvic or hip disease. The operation differs from that of chordotomy in that trigeminal tractotomy is a section of a special intramedullary portion of the peripheral neuron, and not of the relay or crossed tract after the sensory root has ended in the nucleus of the grey matter. A more exact comparison with chordotomy would be a section of the trigeminal fillet, or the central relay from the trigeminal lower nucleus after decussation to the opposite side on its way to the thalamic nuclei.

The operation of tractotomy as practised by SJÖQVIST takes advantage of the known anatomical facts that the trigeminal root on entering the upper portion of the pons splits into two bundles, the tactile and light pressure fibres ending in the principal sensory nucleus close by, while the pain and temperature fibres turn downwards at a right-angle as the descending spinal trigeminal root, the fibres ending in a long nucleus of grey matter which can be traced as far down as the 2nd cervical level. Moreover, it is known that the ophthalmic fibres are the lowest and the mandibular or third division fibres terminate highest in the tract in the lower part of the pons. Section of the tract low down will therefore abolish pain and temperature sensibility more in the upper division of the face than in the lower. The special value of this operation, if further experience proves its safety, is that the patient is not conscious of numbness of the face, as the tactile fibres are uninjured by it, and it is also possible that the risk of keratitis may be diminished as compared with cases of total resection of the sensory root. This point, however, may not prove so satisfactory in practice, as the cornea is said to be supplied by pain fibres only. SJÖQVIST has so far performed this operation on some dozen cases, and one operation at least has been done in this country. In experienced hands it does not appear to be unduly dangerous, though vagus palsy has followed it.

No doubt more will be heard of this procedure in the future, though results already show that it is no more successful than sensory root resection in abolishing the pains of post-herpetic trigeminal neuralgia, or the troublesome paræsthesiæ and burning sensations in the eye and cheek which are a post-operative sequel in occasional cases of root section or of ganglion injection. The treatment of these post-operative paræsthesiæ and of some of the chronic persistent neuralgias of the face, mostly in women, are amongst the chief difficulties of the neurologist and neurological surgeon. Their origin and pathology are hitherto unexplained, though one suggestion that they are nuclear in origin and causalgic in nature is not unreasonable. Another suggestion that they are sympathalgias attracted considerable attention amongst French neurologists at the Réunion Neurologique Internationale in Paris last year, and undoubtedly many cases of atypical facial neuralgia have been relieved in America, in this country, and in France by various forms of sympathectomy. This question, however, bristles with difficulties, the solution of which is still most uncertain and scanty of proof. Whether SJÖQVIST'S operation of trigeminal tractotomy will help *any*

[1] *Dtsch. med. Wschr.* June 3rd, 1938, p. 809.
[2] *Zbl. Neurochir.* 1938, **2**, 274.

of the patients whose symptoms persist after less drastic measures is still doubtful. Further experience will allot to it its proper place in the increasing repertory of the neurological surgeon.

A CENTENARY IN CONVALESCENCE

THE patient leaves hospital or sick-room unready and often unwilling to return to daily life. Again and again we are faced with the need for some invigorating after-treatment—faced with the distresses of the half-cured and, worse, the semi-chronic invalid. Despite much advance here as elsewhere the organisation of the final but vital stage of recovery remains too generally unsystematic and ineffective, so that the victim of an industrial accident or an acute illness stays unnecessarily in LAMB'S "flat swamp left by the ebb of sickness." The stagnation may be as much of mind as of body, and the disability that so often remains is apt to be mental more than physical. But even yet the psychological part of the dual failure is too often overlooked. It was FLORENCE NIGHTINGALE who said, "A little needlework, a little writing, a little cleaning, would be the greatest relief to the sick if they could do it," and it remains as true as ever that restoration of health is greatly aided by occupation as well as by change of thought, change of scene, and (as we still believe) change of air.

On Friday of last week the London County Council opened at Margate the Princess Mary's Convalescent Hospital, the latest and one of the largest on the coast, which will accommodate 223 women, and 14 babies, in four-bed wards and sunny day-rooms. This fine new venture, with its department for physical and fresh-air treatment, may be said to celebrate a centenary, for it is now just a hundred years since the establishment of the first convalescent home at the seaside. Even before that date, however, the value of the coast, especially for the recovery of delicate children, had long been recognised; and in some places in particular, such as Margate, the benefit obtainable in tuberculosis of glands and joints was already known and acknowledged. Since then a long series of reports, from this and other countries, has confirmed the verdict that children so affected, sent from the town to the coast, often make a perfect recovery in bracing marine climates without surgical treatment. Moreover very large and increasing numbers of children with non-tuberculous ailments are now found, summer by summer, on all parts of the coast, not to speak of men and women debilitated by illness or with the organic weaknesses of age. If observation and experience can ever be trusted—and the tradition goes back to EURIPIDES—it is clear that sojourn at the seaside often aids and completes recovery from illness; and it may seem superfluous, after such a demonstration, to call for experimental proofs. Nevertheless comparatively little even yet is known of the ways in which climatic factors affect disease, and the application of scientific method is salutary in all departments of medical practice. The seaside, like other remedies, can do harm as well as good, and much more could usefully be learnt about the effect of sunshine, wind, and cold water, in varying doses, on adults and children in varying states of bodily adaptability. We have to test the powers of adaptation in a "surprised organism," to discover the breaking points of adaptation—the limits for example of resistance to cold. We have to measure more carefully the effects of body cooling and desiccation. Such work might by now have been carried much further if it were the rule for medical investigators to choose their subjects in order of social importance; but so far we have been generally content that the convalescent home should be a home for empiricism.

Elsewhere in our present issue appears an article calling further attention to this centenary of a movement that has already done much for public health in the British islands and might do more. We are glad to learn that the anniversary may be signalised by the initiation of systematic researches into the convalescence of children: a programme of the first series of investigations has been prepared, and with the help of accommodation at the Royal Sea Bathing Hospital it is hoped to begin work shortly at Margate and the adjoining resorts, where there is a good clinical field at all seasons of the year. On the administrative side the larger question arises whether the time has not come for the Ministry of Health to take closer cognisance of the institutions for convalescence in Great Britain, both seaside and inland. A statistical return of the number of adults and children received, the types of illness treated, and the results, would certainly assist the right development of facilities for regenerating subnormal adults and children.

TESTS FOR VITAMIN-B_1 DEFICIENCY

ATTEMPTS are now being made to evolve satisfactory tests for the saturation of the body with vitamin B_1, similar to those in use for vitamin C. At present much depends on having reliable means of estimating the small amounts in urine. Bacterial or mould tests (such as those of SCHOPFER) are not applicable, for the urine contains substances other than vitamin B_1 which stimulate the growth of such organisms. Nor is the formaldehyde azo test sufficiently sensitive. This limits the methods to a biological test (prevention of bradycardia in rats) or to one in which the vitamin is converted to thiochrome by oxidation in alkaline solution, the thiochrome being extractable in n or isobutyl alcohol solution to give a solution that is intensely blue fluorescent in the ultra-violet light. The biological test has the usual disadvantage of inaccuracy with small samples, while with the thiochrome test allowance must be made for residual fluorescence of the urine sample. In early tests (bradycardia) by HARRIS and LEONG,[1] the vitamin was adsorbed on acid clay and fed to the rats. Later, after adsorption, WESTENBRINK and GOUDSMIT [2] used the thiochrome

[1] Harris, L. J., and Leong, P. C., *Lancet*, 1936, **1**, 886.
[2] Westenbrink, H. G. K., and Goudsmit, J., *Rec. Trav. chim. Pays-Bas*, 1937, **56**, 1803.

method, and it was also employed by KARRER and KUBLI,[3] with the modification that the thiochrome was estimated directly by visual comparison with standards instead of photelectrically. Quite recently RITSERT [4] has improved the method by working with the urine rather than an adsorbate, drying the isobutyl alcohol solution, and using compensating fluorescent solutions. By this means it is claimed that very small amounts may be determined—as little indeed as 3 μg. per 100 c.cm. (about 1 international unit).

In assessing the value of such results, the embryonic character of the inquiry must be remembered. According to HARRIS, LEONG, and UNGLEY,[5] using the bradycardia method, the normal daily excretion of vitamin B_1 in the urine is about 12–35 I.U.; but the work of RITSERT suggests a higher value of 30–150 units. In frank deficiency, such as beri-beri, the amount may fall to as little as 2 I.U. per diem, and intermediate amounts are found in various surgical and medical conditions. Vitamin B_1 given by the mouth raises excretion; but the proportion excreted is even smaller than is the case with vitamin C. Of 40 mg. administered perhaps 2 mg. may appear in the urine in two days; the fate of the rest is unknown. There is a tendency towards lower values for excretion of a single test dose (oral) in cases of nutritional polyneuritis than in normal persons, but the figures of HARRIS, LEONG, and UNGLEY indicate wide variation. It appears likely, as these workers say, that more accurate knowledge will be obtained by observing the effect of repeated daily doses on the excretory level. Together with results of this kind, we may note attempts to determine the vitamin B_1 in blood, SCHOPFER'S mould test being employed, as developed by MEIKLEJOHN [6] and SINCLAIR. LAURENT and SINCLAIR [7] have lately reported a case of peripheral neuritis associated with pyloric stenosis in which a value of 4 μg. per 100 c.cm. during the neuritic stage was raised to 10 μg. per 100 c.cm. in the cured patient.

The knowledge so far gained is applicable only to extreme deficiency, but the methods of estimation are now advancing beyond the preliminary stage, and we should soon have accurate information about the behaviour of vitamin B_1. But until much more is known about the fate of the disappearing vitamin, it will be hard to say how far saturation tests are valuable as an index of disease. It is known that the body does not carry a large store of vitamin B_1, but low excretion after a test dose may be explained either by replenishment of the body stores or by destruction at an increased rate. The margin of loss with large doses suggests that, provided absorption is normal, there is no point in giving large doses of this vitamin; small doses more frequently should be better.

[3] Karrer, W., and Kubli, U., *Helv. chim. Acta*, 1937, **20**, 369.
[4] Ritsert, K., *Disch. med. Wschr.* April 1st, 1938, p. 484.
[5] Harris, L. J., Leong, P. C., and Ungley, C. C., *Lancet*, March 5th, 1938, p. 539.
[6] Meiklejohn, A. P., *Biochem. J.* 1937, **31**, 1441.
[7] Laurent, L. P. E., and Sinclair, H. M., *Lancet*, May 7th, 1938, p. 1045.

CHEMOTHERAPY OF PNEUMONIA

SOME 200 cases of lobar pneumonia were admitted to the Dudley Road Hospital, Birmingham, between March and June of this year. Of 100 receiving the usual non-specific treatment 27 died. Of 100 treated by Dr. EVANS and Dr. GAISFORD with the new drug, M. & B. 693, only 8 died; and 6 of the deaths were in the first few weeks of the investigation when smaller doses were being given than are now considered adequate in severe infections. These facts, published on p. 14, are substantial evidence in favour of the clinical use of a remedy which has already proved its worth in animal experiments [1] as well as in individual cases.[2] In clinical tests it is always difficult to devise a scheme for adequate control and the method adopted at Birmingham is not free from disadvantages from the statistical standpoint. The control series, however, seems to have been sufficiently comparable in essential features to enable the results to stand examination with credit to both the authors and the drug. The former deserve praise for a skilful and modest presentation of their observations. The main point to which criticism might be directed is that, since the case-mortality rate is known to vary greatly with the type of infecting organism, and WHITBY'S experimental work suggests a greater therapeutic effect of the drug on some types than on others, the type found in each case should have been recorded. It appears that typing was attempted in all treated cases where sputum was obtainable, but that in less than half (44) of the total number was it possible to identify the type. For the fact that, for reasons of space, the full protocols of the 100 cases have not been printed, we take responsibility. Since the series was obviously listed in random order as regards such relative factors as sex, age, lesion, day, and degree of illness, the notes on every fifth case suffice in our view to illustrate the way in which the records were kept and analysed, and they certainly do not give an unduly favourable idea of the results, since they happen to contain four of the eight deaths in the series. That the new remedy merits widespread trial is evident not only from the relative case-mortality figures mentioned above but from analysis of the deaths according to age-groups, and the benefit apparently obtained in those over 40 is the more encouraging since serum therapy has often been disappointing in these older patients. Another point of contrast with serum therapy lies in the gradual improvement following M. & B. 693 compared with the more dramatic fall of temperature produced by serum.

Mr. ALECK W. BOURNE, obstetrical surgeon to St. Mary's Hospital, Paddington, and consulting obstetrical surgeon to Queen Charlotte's Hospital, has been summoned by the police on a charge of unlawfully using an instrument with intention to procure a miscarriage. The operation was performed at St. Mary's Hospital. Mr. Bourne's defence is being undertaken by the London and Counties Medical Protection Society.

[1] Whithy, L. E. H., *Lancet*, May 28th, 1938, p. 1210.
[2] Telling, M., and Oliver, W. A., *Ibid*, June 18th, 1938, p. 1391.

ANNOTATIONS

TREATMENT OF MENINGOCOCCAL MENINGITIS

SEVERAL previous reports on small numbers of cases have agreed in commending sulphanilamide as a remedy for cerebro-spinal fever. The vast resources of the London County Council hospital system have meanwhile enabled Dr. H. Stanley Banks to study the treatment of this disease on a scale impossible anywhere else in this country, and an account of his results will be found on p. 7. The total of 113 cases is divisible into three groups, treated respectively with serum alone, with serum and sulphanilamide, and with sulphanilamide alone. These are mentioned in a descending scale of mortality, from which it may be concluded that sulphanilamide is more efficient than serum. It would be interesting, though of course it is impossible, to know what the mortality would have been in cases receiving neither, for the only element of doubt remaining concerns the value of serum, and whether it should be given in addition to sulphanilamide. Walsh,[1] analysing large-scale American statistics, concludes that the mortality during the past sixteen years has varied between 38 and 67 per cent., and that it has been little influenced by treatment.

In assessing the value of serum, it is necessary to take account not only of the type of serum used but of the method of its use, and Dr. Banks's policy of massive intravenous dosage may well be an important factor in success. The theory underlying the production of so-called meningococcus antitoxin has been a subject of some dispute, and the relative merits of this serum and those produced by immunisation with whole meningococci have never been satisfactorily settled. Whatever the method of preparation, different batches vary in potency, and the only conclusive test of efficacy is that of clinical trial. It has lately been suggested from an authoritative quarter in the United States[2] that an attempt should be made, by correlating clinical effect with the results of laboratory test, to define some means of ensuring more constant efficacy. In some ways it is astonishing that while other forms of serum treatment have steadily increased in reliability and precision, the production of antimeningococcal serum should still be clouded with so much uncertainty.

It is a relief to turn from this difficult question to the simplicity and certainty of sulphanilamide treatment. Here the work of Dr. Banks and his associates furnishes important information on one point that was still obscure: it now seems clear that when the drug is given by the mouth an adequate concentration appears in the cerebro-spinal fluid; indeed with the massive dosage used some of these concentrations are higher than any hitherto recorded. The clearest and most emphatic conclusion to be drawn from these valuable observations is that every case of meningococcal meningitis should be given large doses of sulphanilamide at the earliest possible moment. Whether the intrathecal route of administration is unnecessary, as is suggested here, and what are the indications, if any, for combined serum treatment, are subsidiary questions which further experience will doubtless settle. Another matter into which inquiry might well be made is the effect of chemotherapy on the infection in the nasopharynx. This could readily be studied in cases of meningitis, or alternatively in carriers, for whom the treatment may solve a previously very difficult problem. Since sulphanilamide has been found in every one of the body fluids in which it has been looked for during the administration of the drug, including even prostatic secretion, it presumably appears in the nasopharyngeal mucus. If it should be found to cause the disappearance of meningococci from this situation as rapidly as from the meninges, the carrier condition will for the first time be capable of ready control.

[1] Walsh, G., *J. Amer. med. Ass.* June 4th, 1938, p. 1894.
[2] Branham, Sarah E., *Publ. Hlth Rep., Wash.* April 29th, 1938, p. 645.

LEPROSY IN WESTERN EUROPE

FOR many years the medical profession in countries such as England and Wales has been happy in the belief that leprosy was not contagious under Western European conditions. It was believed to be almost exclusively a colonial problem and—apart from concealing in decent obscurity those victims of leprosy acquired abroad who had managed to slip back to the mother country—it was held to present no problems for those European countries in which the social and hygienic standards were reasonably good. Certain facts set out by Prof. Charles Flandin in the Prosser White oration reported on another page suggest that this complacent attitude may no longer be justified. Prof. Flandin is in charge of a leprosy ward at the Hôpital Saint Louis in Paris and his sympathetic interest in lepers has led him to discover 10 cases in the past three years which were beyond dispute of indigenous origin, all in adult white French citizens who had never left France. Moreover the length of time between the first exposure to infection and the establishment of the diagnosis was in some instances considerably shorter than had hitherto been considered possible. In this country, according to an answer given by the Minister of Health in December, 1937, in the House of Commons, only 4 cases of possible indigenous origin have been discovered over a long period of years. As to the total number of lepers in England and in France, little is known. In France notification is compulsory and 95 lepers have been traced in Paris alone. But Prof. Flandin thinks that the number may be considerably larger, since notification has proved a deterrent rather than an aid to ascertainment. In England and Wales—as appears from the Parliamentary answer quoted above—38 cases are known to the Ministry of Health.

Such are the facts. Has there been merely better ascertainment of indigenous cases in recent years or is Prof. Flandin right in his suspicion that a real increase in indigenous cases is occurring? If so, is this due to an increased virulence of the disease or to a decrease in resistance in the host? Since the last native case of leprosy in Great Britain is supposed to have died in the Shetland Islands in 1798, it seems difficult to see why racial immunity, if any, should maintain itself for a century or so and then suddenly diminish: nor does it seem likely that the number of those "exposed to risk" have increased of recent years. Travelling facilities have certainly improved but the total number of lepers returning from abroad is not likely to have altered substantially in either England or France. If the increase in indigenous cases is a real one—and this is by no means certain—the most likely explanation seems to lie in a rise in virulence of the organism.

A hopeful aspect of the situation is that Prof. Flandin's experience has not led him to reject orthodox opinion on the conditions necessary for infection.

To imagine, as the public does, that casual contact may cause leprosy is, in his view, quite unjustifiable, and all his cases have arisen from close and prolonged contact with a leper, as in the intimacies of family life. Since notification and official action seem to be definitely contra-indicated and since real hardship and cruelty might be, and indeed have been, caused by ill-advised publicity, what can be done? First, the possibility of leprosy must be borne in mind by the diagnostician and some sort of organisation for the ascertainment of cases should be set on foot to take the place of compulsory notification; secondly, the public must learn to realise that there is no more—and no less—reason for a leper to be an outcast from society than there is for a tuberculous person; and thirdly, such cases of leprosy as require institutional treatment should be able to obtain it. In this country there exists but one institution for the reception of lepers, the Homes of St. Giles, supported entirely by voluntary contributions. Should the public fail to provide all that is required from voluntary sources, here is a strong case for official subsidy.

INTESTINAL STASIS DUE TO HYPOPROTEINÆMIA

HAVING shown [1 2] that stasis in the stomach following Billroth operations Types I and II is associated with a low percentage of protein in the plasma, Barden and his associates [3] have now studied the effects of artificially produced reduction of plasma protein on the mobility of the small intestine of dogs. The reduction was obtained by feeding on a protein-free diet or by bleeding and returning the cells only to the circulation, the plasma being removed. In each animal tested slowing of the intestinal movements could be demonstrated by X rays, and could be cured by raising the plasma protein to a normal level, either by a high protein diet or by returning to the circulation the plasma which had previously been withdrawn. The stasis was thought to be due to œdema, which is recognised as a possible cause of obstruction after operations on the stomach. These findings suggest that an estimation of plasma protein might be a wise precaution before major abdominal operations, particularly where the patient has been on a restricted diet.

A METHOD OF PREVENTING OR ENDING LACTATION

ACCORDING to Ramos and Colombo [4] of Buenos Aires the artificial termination of lactation is achieved with greatest certainty and safety by means of œstrin. They argue that after the breasts have enlarged during pregnancy the final changes leading to the secretion of milk are inhibited by the œstrin circulating in the blood; during the first three days of the puerperium the circulating œstrin rapidly disappears and milk secretion then begins. In the past two years they have applied this hypothesis to 50 cases in which inhibition of milk secretion was required. The preparation employed was œstradiol benzoate in an oily solution, and the dose 10,000 units by intramuscular injection at twelve-hourly intervals for three and exceptionally for four doses, beginning when the state of the mother or the death of the child made it advisable that lactation should be suppressed. If the injections are begun immediately after delivery no other treatment is required, and the mother, it is stated, has no obvious discomfort or congestion of the breasts to remind her of the loss of her child. When milk secretion has begun it is advisable, besides giving the injections, to empty the breasts mechanically between the second and third doses of œstrin so that the third, or if necessary the fourth, dose can produce complete suppression. A curious feature of the success claimed for this method is that once the lactation has been stopped it does not begin again unless a new pregnancy starts. Ramos and Colombo explain this by comparing the large doses of œstrin they use with the much smaller amounts recoverable from the blood of women during the early puerperium. They also believe that the oily secretion used is but slowly absorbed and thus maintains its effect long enough to promote retrograde changes in the secreting tissues in the breasts. Measurable amounts of œstrin could be detected in the patients as long as twenty days after injection of the oily preparation.

As a sidelight, so to speak, Ramos and Colombo offer a warning against the use of œstrin to induce labour. They have observed gross interference with lactation during the first week of the puerperium in three patients thus treated—an observation which helps to confirm the value of their method of suppressing lactation when this object alone is desired.

[1] Barden, R. P., Ravdin, I. S., and Frazier, W. D., *Amer. J. Roentgenol.* 1937, **38**, 196.
[2] Mecray, P. M., Barden, R. P., and Ravdin, I. S., *Surgery*, 1937, **1**, 53.
[3] Barden, R. P., Thompson, W. D., Ravdin, I. S., and Frank, I. L., *Surg. Gynec. Obstet.* 1938, **66**, 819.
[4] *Disch. med. Wschr.* May 27th, 1938, p. 782.

VITAMIN VALUES FOR FOODSTUFFS

A FEW months ago the issue of a monograph by Miss Katherine Coward, D.Sc., on the biological standardisation of the vitamins provided an important milestone in the science of nutrition. Another has been reached with the publication of a new set of tables of the vitamin values of foodstuffs, in the compilation of which a very important principle has been applied. The tables are published as part of Vol. 7, Part 4 of *Nutrition Abstracts and Reviews*; they can also be obtained separately (price 2*s.* 6*d.*) from the Imperial Bureau of Animal Nutrition, Rowett Institute, Aberdeen. They have been prepared by two competent workers in the vitamin field of nutrition, Miss Margaret Boas Fixsen, D.Sc., and Miss M. H. Roscoe, Ph.D. The values have been collected from the vast literature of the subject and have been critically sifted, with a sieve woven, as it were, from the principles in Dr. Coward's book. Only those values have been admitted which have been obtained by chemical or spectroscopic methods, or by approved methods of biological standardisation, that is, methods which include a simultaneous test against the international standard, and yield results expressed in international units. No values expressed in purely biological units of animal response have been accepted, and values obtained by converting such biological units into international units by means of a fixed conversion factor have been rigorously excluded as being too variable to be reliable.

The tables are the first of their kind to embody this principle and they will be doubtless widely used in dietary surveys to work out the vitamin values of diets after the data have been collected in the field. Those engaged on this intricate task may be warned that they will be disappointed if they hope to find a tidy, fixed value for each foodstuff in these tables. Instead they will be confronted with a very wide range of values, and will find it hard to decide which to choose. The uncomfortable truth must be faced that the vitamin values of foods do, in fact, vary very much even in the raw state, according to soil and

climate, and according to species, variety, and even individual substance. Cooked and manufactured foods present even greater potential variation, but these tables are to be followed by others issued in the same journal and also separately in which the values for cooked foods will be placed on as satisfactory a footing as possible. To prevent any false impression that the vitamin content of a diet can be expressed in precise terms a useful procedure is to calculate its maximum and minimum value from the maximum and minimum values given in the tables for the various constituents of the diet. In this way a reasonable degree of confidence can be felt that the vitamin content of the diet really does lie within those bounds, and no gravely false conclusion will be drawn. No greater degree of certainty is at present attainable.

EXPERIMENTAL SPLENOMEGALY

IT has long been known that exposure to certain toxic substances may give rise to splenomegaly in association with cirrhosis of the liver. The splenomegaly has been attributed either to a toxic action on the spleen or to portal obstruction caused by the liver cirrhosis, and the tendency lately has been to regard other types of splenomegaly—especially the ill-defined group bearing the name of Banti—as also secondary to some form of portal obstruction, often cirrhotic in origin. Dr. Menon [1] now reports experimental observations which carry us rather further. After chronic intoxication with certain poisons, known to cause liver damage, he found that the spleens of rabbits showed fibrotic and proliferative reactions giving rise to splenomegaly but independent of portal stasis and cirrhosis of the liver. The changes in the spleen were noted at a stage when necrosis alone was found in the liver, that is to say, the splenomegaly was pre-cirrhotic. The changes noted in the spleen were comparable with those seen in hepatolienal fibrosis or splenic anæmia as described by McMichael.[2] With small doses of the poisons hyperplastic reactions were noted in the Malpighian follicles, which were not unlike the condition described as "lymphoid reticulosis" in man. These observations suggest that exposure to minute amounts of toxic substances must in future be considered among the possible causes of obscure splenomegalies and "splenic anæmias."

FEATS OF AMPUTATION

THE prodigies of emergency surgery performed by military surgeons such as Percy and Larrey in the Napoleonic wars were perhaps more remarkable as examples of endurance than of surgical wisdom. Baron Larrey, who, according to Dr. Paul Hauduroy in the *Revue d'Hygiène* for May, took part in 25 campaigns and 60 battles between 1796 when he joined the army of Italy and his death in 1842, was a keen and authoritative advocate of immediate amputation, even under the most adverse conditions. At the battle of Mosaisk, during the Russian campaign, he personally performed 200 amputations in the first twenty-four hours, and at Eylau, which he describes in his memoirs as the most terrible he had ever seen, he and his assistants worked in open barns at a temperature of −14° C. Larrey's indications for primary amputation were not accepted by all of his surgical contemporaries. In particular the American surgeon James Mann, who was medical adviser to General Dearborn in his campaigns of 1812 and 1813, held that a greater mortality followed early amputations than those which were deferred,[1] and that by delaying amputation it was often found unnecessary. Those of Larrey's indications in which Mann proposed more conservative measures included compound fractures where the main artery was uninjured, fractures involving joints, the denuding of a large portion of bone without fracture, and wounds with a cutting weapon opening the larger joints such as the knee and elbow. In some of these Mann agreed that amputation had to be done later, but it could then be carried out at leisure and under favourable circumstances, and Mann maintained that his conservative methods were attended by a much lower mortality. Dr. Phalen, in commenting on Mann's contributions to surgery, remarks that had his views been planted firmly in the mind of every medical officer it would not have been necessary to learn them anew, by bitter experience, in every succeeding war for the remainder of the century.

[1] Menon, T. B., *J. Path. Bact.* 1938, **46**, 521.
[2] McMichael, J., *Edinb. med. J.* 1931, **38**, 1.

VACCINATION AGAINST PERTUSSIS

AMONG other constructive suggestions for the control of whooping-cough (which he prefers to call pertussis, since many victims never whoop) Dr. Robert Cruickshank gives prominence to the trial, on a large scale, of prophylactic immunisation. Such a test is the more desirable since various methods of active immunisation against whooping-cough that have been from time to time tested and reported have given somewhat conflicting results. While some vaccines like the one used in the well-known experiment described on p. 36 appear to have conferred a measurable advantage on the inoculated persons, others have given no protection whatever.[2] Some part of these inconsistencies may well be referable to the difficulties, which Dr. Cruickshank does not minimise, of carrying out efficient and properly controlled tests. The fundamental evidence for or against means of active immunisation *must* lie in the reactions of immunised persons exposed to the risk of natural infection. No other test, however much it justifies the experimental adoption of a vaccine, can supply the final answer, and the difficulties of trials in "real life" must therefore be faced and overcome if the advantage of a vaccine is to be properly assessed. Though whooping-cough is less infectious in hospital wards than, say, measles or chicken-pox its high infectivity in the home[3] should reduce the difficulties in one respect, for unimmunised and susceptible controls should habitually contract infection while the immunised should, if the vaccine is of benefit, escape. On the other hand only when the experiment covers large numbers will the disease be introduced into the home often enough for the comparison to be made effectively. On balance the evidence fully justifies the continued search for the most effective vaccine and for means of testing products on a large scale.

A new method has been devised by W. T. Harrison, J. P. Franklin, and J. A. Bell of the public health services of the U.S.A. and the State of Maryland.[4] Since the clinical course of pertussis infection in children suggests that immunity is not developed rapidly, they concluded that a vaccine characterised by prolonged action would offer greater chances of success than one in which absorption and excretion took place more rapidly. On the analogy that the precipitation of diphtheria toxoid by potassium

[1] Phalen, J., *Surg. Gynec. Obstet.* June, 1938, p. 1072.
[2] Sauer, L., *Amer. J. Dis. Child.* 1937, **54**, 979.
[3] Wheeler, R. E., Milbank Mem. Fund, 1935, **13**, 366; and 1936, **14**, 81 and 180.
[4] *Publ. Hlth Rep., Wash.* No. 20, May 20th, 1938, p. 793.

aluminium sulphate or adsorption with aluminium hydroxide greatly increases its antigenic efficiency, they prepared, by a described method, an alum-precipitated pertussis vaccine. Trial of this was undertaken at Cumberland, Maryland, in children aged approximately 1 to 3 years and residing in two areas populated by families of roughly uniform economic status. The children were allocated at random to vaccinated and control groups—those whose surnames began with the 2nd, 4th, 6th, &c., letters of the alphabet being controls, those of the 1st, 3rd, 5th, &c., letters being injected subcutaneously with 1 c.cm. of the vaccine suspension in November, 1936. No undue reactions were noted. Four public health nurses made repeated visits to these families throughout the ensuing year. An epidemic of whooping-cough occurred in Cumberland in June, 1937, so that conditions for the test were favourable. In all 241 children were chosen for study, but 50 for various reasons were eliminated (half of these could not be traced at the end of the period, and a quarter were in the wrong surname group). This left 82 vaccinated and 109 unvaccinated children, reasonably equivalent in other respects. Of the former 10, or 12 per cent., suffered from whooping-cough during the year, and of the latter 21, or 19 per cent. The difference slightly favours the vaccinated children but on any technical test is not more than might well be due to chance. Of the 10 cases in vaccinated children however, 7 were classified as mild, 2 moderate, and 1 severe, while of the 21 cases in the unvaccinated only 3 were mild, 11 were moderate, and 7 severe. In the vaccinated children 8 household exposures resulted in 3 cases while 10 such exposures in unvaccinated children gave as many as 8 cases. From these figures the authors are justified in concluding that the vaccine probably has some prophylactic value but too little to be demonstrated as real in a trial of this size. They therefore propose to extend their observations using a longer period of antigenic stimulation and the injection of two doses of vaccine at an appropriate time interval.

In this country Dr. Cruickshank's idea of using infant welfare centres throughout the country to provide groups of children of suitable age for trial of prophylactic immunisation is a hopeful one provided that the support of local authorities and parents could be obtained. Compulsory notification of the disease would probably be necessary if the full benefit of such a scheme is to be obtained, and might in itself lead to a diminution of serious sequelæ by promoting early diagnosis and treatment.

MENINGEAL INFECTION IN MUMPS

IT is generally accepted that the causal agent of mumps is a filtrable virus and that the most usual incubation period between infection and manifest enlargement of the salivary glands is eighteen days. It is well recognised, too, that an attack of mumps may be preceded by a meningeal reaction, with an increase of lymphocytes in the cerebro-spinal fluid, or that a similar reaction may occur later in the attack; evidence has been produced also that "mumps" may be represented by a meningeal reaction alone. Complications affecting several of the cranial nerves, particularly the auditory nerve, are not very unusual. There is thus already considerable clinical evidence that the virus of mumps tends to neurotropism; and V. de Lavergne, P. Kissel, and H. Accoyer [1] added to it by their study of the cerebro-spinal fluid of contacts. Lumbar punctures performed on the fifteenth day after contact, that is to say "from three to five days before the likelihood of appearance of parotitis," showed in 17 children a lymphocyte count of less than 3 cells per c.mm. but in 4 a count ranging from 3·5 to 12. The authors suspected that these four children were incubating mumps, but in fact only one of them developed parotitis. In an attempt to ascertain the significance of the lymphocytosis in the remaining three M. de Lavergne and his collaborators examined, under the same conditions, the cerebro-spinal fluids of another group of 25 contacts. In 21 of these the lymphocyte count was less than 3 per c.mm., but in 4 others counts of 4, 4, 4, and 5 were obtained. The puncture fluids derived from this group of 4 were inoculated intrathecally into rabbits, and histological examination of the central nervous system showed in 2 of the 4 definite lesions of meningo-encephalitis. One of the two donors of these fluids developed mumps; the other escaped. The authors conclude that the cerebro-spinal fluid on the fifteenth day of the incubation period of mumps is already virulent and shows a lymphocytosis which, although slight, is sufficient to differentiate those contacts who will develop the disease; also that the meningeal reaction of mumps is in fact demonstrable during the incubation period, although only exceptionally does it become clinically evident either in the invasion period or during the stage of parotitis as "primary" or "secondary" mumps-meningitis. They suggest that the reason why many persons, although frequently exposed to infection, never develop overt mumps lies in their development of immunity following a clinically "occult" meningeal reaction to the virus. During a discussion on this communication Dopter suggested that the virus may reach the central nervous system by the same portal as the viruses of anterior poliomyelitis and epidemic encephalitis, and the meningococcus—viz., the nasopharynx and the sheaths of the filaments of the olfactory nerves; but no explanation was offered as to the path of infection of the salivary glands. That the virus travels widely when once introduced into the tissues is obvious from the occurrence of metastases such as orchitis which, incidentally, has been recorded as a primary clinical event. If the virus is, as Dopter believes, essentially neurotropic with a primary meningeal localisation, it may be that parotitis itself is really a metastasis. In any case, it seems that the real incubation period following infection may be fifteen days, that is three days or so before a clinical syndrome is ordinarily manifest.

[1] *Bull. Acad. Méd. Paris*, 1938, **119**, 534.

THE INTERNATIONAL SURGICAL CONGRESS

FOR reasons not yet explained, the German authorities have cancelled the congress of the International Society of Surgery which was to have been held in Vienna from Sept. 19th to 22nd. In order that the material prepared for the discussions may not be wasted, and to diminish disappointment, the executive are making plans to hold a congress in Brussels on the same dates. Particulars will be circulated to members as soon as possible.

THE Rockefeller Foundation have increased their grant to psychiatric research at the Maudsley Hospital. For the next five years they will give £5000 annually to be devoted to laboratory investigations and to others having a more directly clinical bearing. Besides the research already undertaken, further work will be initiated on pharmacological, social, and other problems relevant to mental disorder.

CONTROL OF THE COMMON FEVERS

WHOOPING-COUGH OR PERTUSSIS

Reviewed by Dr. ROBERT CRUICKSHANK, *Pathologist, L.C.C. Group Laboratory, North-Western Hospital, Hampstead*

A CENSUS of articles and editorials in the medical press during the past decade would reveal an increasing amount of space given to the discussion of whooping-cough. These efforts to acquaint medical men with the newer knowledge about one of the most serious of childhood diseases have doubtless had considerable effect, but there are still many medical officers of health and practitioners who seem apathetic to the gravity of the infection or ignorant of the methods available for its early diagnosis, control, and prevention. Possibly the difficulties of early *clinical* diagnosis and the general feeling of helplessness regarding treatment largely explain the apparent apathy, and yet a well-organised attack on whooping-cough would probably save more lives than do many schemes sponsored by State or local authority in the name of preventive medicine.

There is something not quite right with the name of the disease and I should like to support a recent plea of Gardner (1936) for its designation by the older term "pertussis." So many patients with mild attacks never "whoop" and even with more severe infections the whoop is irregularly present and occurs at so late a stage of the disease that the perpetuation of the name whooping-cough is misleading. Smith (1936) for example in a carefully observed group of 26 boys who developed the infection at school found that only 5 of them whooped for short periods in the third or fourth weeks of the disease. Early diagnosis —which is to be encouraged—will never be successful if the mother or doctor waits for the child to whoop.

Mortality

It is difficult to obtain reliable figures for the mortality-rate in pertussis, since on the one hand the disease is not generally notifiable and on the other a proportion of deaths attributable to whooping-cough are probably returned as broncho-pneumonia, convulsions, enteritis, and the like. Stocks and Karn (1932), however, from notifications in four London boroughs estimated the case fatality for children under one year as 4 per cent., from one to two years 3·35 per cent., two to five years 0·7 per cent., and the general fatality-rate as 1·26 per cent. It may be worth quoting estimates of 40,000 deaths from whooping-cough in England during the decade 1921–30, over 20,000 in Germany during a five-year period (1926–30), and 6000 deaths in one year (1928) among children under five years in the United States (Madsen 1937). Among London children aged 0–5 years (1929–33) pertussis was ranked fourth in the causes of death with an annual average of 434. It was preceded by congenital causes, pneumonia, and diarrhœa in that order, and followed closely by measles at 423·6 deaths per annum, while diphtheria with 184·2 was eighth and scarlet fever eleventh with 42·8 (L.C.C. Annual Report, 1935).

In hospital practice the case mortality of pertussis varies considerably. In the L.C.C. hospitals during the five years 1929–33 it was 8·47 per cent. compared with 5·31 per cent. for measles, 4·1 per cent. for diphtheria, and 0·4 per cent. for scarlet fever. In Glasgow hospitals, where a high proportion of the children are admitted with respiratory complications, the case fatality (1931–35) was 27 per cent., ranging from 44 per cent. for children under one year and 35 per cent. in the one to two year old group down to 5 per cent. in children aged five to ten.

In spite of these appalling figures, deaths from pertussis have decreased by nearly 70 per cent. since the middle of last century, the fall being proportional in the three age-groups 0–4, 5–9 and 10–14 years (Fig. 1). This decline in mortality has affected all four of the common infectious diseases, but particularly scarlet fever, so that measles and pertussis together now account for over 60 per cent.

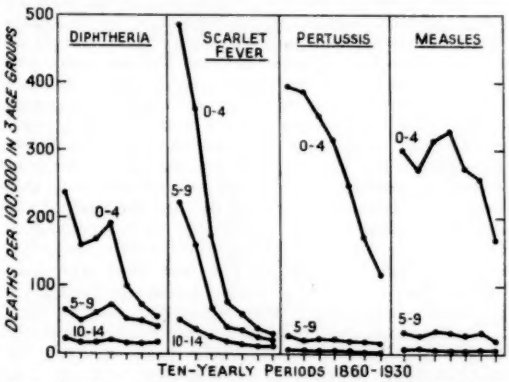

FIG. 1.—Deaths per 100,000 from diphtheria, scarlet fever, pertussis, and measles.

of the deaths (about a third each) due to these four infections, whereas in 1860 they caused only 40 per cent (Fig. 2). It seems unlikely that one and the same factor is responsible for the remarkable decline in the mortality of these infectious diseases since the curves do not synchronise.

Prevalence

Public health apathy to pertussis is reflected in the fact that the disease has never become generally notifiable, so that its incidence cannot be accurately gauged. In a few of the London boroughs notification has been compulsory for some years and in several of the Scottish burghs a system of voluntary intimations is in force. Stocks from his analysis of the notifications in four London boroughs has estimated that 44 per cent. of London children have had pertussis before their fifth birthday and 60 per cent. by the age of ten. From the recent report to the Medical Research Council on "Epidemics in Schools" (No. 227) it appears that over 70 per cent. of 7481 boys aged 13–18 had had measles and pertussis and only 8·3 per cent. scarlet fever, while the number having had diphtheria was negligible. The marked difference in the attack-rate of these infectious diseases should be borne in mind when any public health schemes for their prophylaxis is being promulgated. Obviously it is more important to save 60–70 out of every 100 children from the consequences of a disease like pertussis, which may cause both physical and psychical damage of a permanent nature, than to protect only a few of these children from a clinical attack of diphtheria which if diagnosed early is very amenable to specific therapy.

An interesting and unexplained phenomenon relating to the morbidity of pertussis is the greater

incidence of the infection among females. For example, the total admissions of pertussis into the Glasgow Fever Hospitals from 1931 to 1935 were 1378 males and 1565 females or, under five years, 1254 males and 1397 females. The case mortality for males was 27 per cent. and for females 26 per cent. However, Madsen believes that the greater number of recorded deaths in females is due to a higher case death-rate and not to a greater incidence.

The epidemic periodicity of pertussis must be reckoned from attack-rate and not from mortality figures, since the latter are higher during the winter months when complications such as broncho-pneumonia are more frequent. In spite of inadequate statistics, pertussis seems to have a biennial periodicity in this country, usually alternating with measles, although, like measles, it probably has not the same fixed seasonal trend as have scarlet fever and diphtheria. Stocks's figures for the London boroughs show a two-yearly periodicity, but the peak may occur in the summer with the epidemic wave rising again in the following winter and spending itself during the succeeding summer and winter. When the figures for the Scottish burghs are plotted in 4-weekly periods, a biennial periodicity referable principally to Glasgow is evident with the peak of the epidemic usually occurring in the early months of the year (Fig. 3). Part of the winter rise in the inter-epidemic years is due to the fact that Aberdeen differs from the other principal burghs in having its epidemic of pertussis in these alternate years.

In Denmark the epidemics occur more irregularly at 4–5 yearly intervals with the peak one year in mid-summer, another in mid-winter, and so on. Madsen believes that the periodicity of the infection is determined by the proportion of hitherto unattacked susceptibles. Stocks holds that the end of the epidemic wave in pertussis, as in measles, is brought about by the latent immunisation of contacts. This latent immunity usually lasts for a year in pertussis so that in the year following the epidemic there is again a sharp increase in the number of susceptibles and conditions are suitable for another outbreak.

Use of Laboratory Tests

Although early clinical diagnosis of pertussis is admittedly difficult, especially in inter-epidemic periods, the usefulness of laboratory diagnostic tests is not yet generally realised. Enough has been done to prove the utility of certain specific tests—viz., the isolation of *B. pertussis* and the demonstration of specific antibodies in the patient's blood, and of hæmatological examinations—total and differential white cell count and sedimentation-rate—for the diagnosis, and particularly for the early diagnosis, of pertussis. Use of the specific tests mentioned presupposes a causal relationship between *B. pertussis* and the disease, and it may be well to reiterate the points in support of this belief.

(1) *B. pertussis*, a small Gram-negative coccobacillus somewhat resembling Pfeiffer's bacillus, has been isolated from over 90 per cent. of patients in the early infectious stage of the disease and but rarely from convalescents or unaffected persons. (2) With pure cultures of the organism the infection has been reproduced in human volunteers and in apes, whereas this was not achieved with culture filtrates. (3) Specific antibodies to *B. pertussis* develop in the blood of naturally or experimentally infected individuals; human or other animals in which such antibodies are demonstrable after vaccination are immune to attack. Attempts to establish a filtrable virus as the cause of pertussis have failed, the only acceptable evidence adduced in its favour being the unverified post-mortem finding of inclusion bodies in about a third of the secondary pneumonic lesions (McCordock 1932). The infectiousness of pertussis, the solid immunity, the interstitial reaction in the lung, and degenerative lesions in nerve ganglia need not be regarded as indicative of virus ætiology since they can all be paralleled by known microbial infections.

ISOLATION OF THE CAUSAL ORGANISM

The only absolute diagnostic criterion of pertussis is the isolation of the causal organism. For this purpose the cough-plate method introduced by the Danes, Chievitz and Meyer in 1916, in which the child coughs on to the special Bordet medium in a Petri dish held 4 in. in front of its mouth, is most generally applicable. Points of importance for the success of this method are :—

(1) The medium should contain 30–50 per cent. of blood and the surface should be free from pitting (plates may be used up to two weeks after preparation provided they are kept in the cold and free from moulds).

(2) Two plates should be exposed: for children of two years upwards 4–6 actual barks on to the plate are sufficient; for infants a longer exposure is required depending on the expulsiveness of the cough, but *over-exposure of the plate must be avoided* otherwise the colonies of *B. pertussis* are swamped by other more quickly growing organisms.

(3) Exposure of the plates during a natural spasm is usually recommended but requires speed, time, and patience; in a busy ward or clinic an induced spasm, e.g., by pressure of the glottis—the use of a tongue depressor is apt to cause vomiting—gives satisfactory results.

The inoculated plates may be sent through the post (for this purpose aluminium dishes are essential) or kept overnight in the cold without detriment. The plates are incubated at 37° C. for *three days*, when they are examined, preferably with a hand or watch-maker's lens, for the tiny mercury-drop colonies of which in a sparsely inoculated plate there may be only one or two. Final identification is made on morphology and slide-agglutination of a subculture.

The results have not been uniformly successful. Successes are reported, failures often are not. But undoubtedly excellent results may be obtained after a little practice in the preparation of a satisfactory medium and experience in the recognition of the typical colony together with intelligent coöperation by the mother or nursing staff. The percentage of positive reports is naturally highest during epidemic periods when diagnosis is earlier and cases come to hospital or clinic within the first 2–3 weeks of infection. For example, Donald (1938), with a large series of patients admitted to the North-Western Fever Hospital (L.C.C.) in the winter of 1936–37, recorded over 90 per cent. positive cough-plates during the first three weeks of the disease; in the fourth week less than half of the plates were positive; and in the fifth and subsequent weeks the percentage of positive results was negligible. Other workers, particularly in Denmark and America, have recorded similar findings.

The disadvantages of the method are the difficulties associated with preparation, dispatch, and satisfactory exposure of the cough-plate, and the delay in reporting—at least three days are required. To overcome the former difficulty MacLean (1937) has suggested the use of the pharyngeal swab together with penicillin to inhibit the growth of Gram-positive bacteria. Straker and Westwater (1937) also reported encouraging results with the pharyngeal swab, which seems particularly applicable to infants or to save time or for use in schools or clinics some distance from the laboratory.

DEMONSTRATION OF ANTIBODIES

The *complement-fixation test*, performed like the similar test for gonococcal infection and using as antigen a heat-killed suspension of a freshly isolated strain standardised to 2000 million organisms per c.cm., is useful for the late diagnosis of pertussis. The reaction becomes weakly positive about the end of the third week and increases in positivity until the seventh to eighth week after which it becomes weaker again and may be entirely negative by the twelfth to fifteenth week after infection. Delayed positive reactions may occur, particularly in infants or in the presence of complications like broncho-pneumonia. Children who have had pertussis may during another febrile illness give weakly positive reactions, whereas intimate contacts even after long exposure usually fail to react (Donald 1938). Thus a definitely positive test (fixing 4–6 doses of complement) indicates a recent attack of pertussis, and may be most useful in tracing a source of infection and in establishing or refuting the diagnosis of pertussis in children with chronic cough.

The *skin-test* or the intradermal injection of a vaccine of whole or disrupted *B. pertussis* has been tried by many workers as a criterion either of susceptibility (like the Dick test) or of sensitivity (like the tuberculin reaction) to pertussis, but the results obtained have been so contradictory (e.g., Siebler and Okrent 1934, Paterson et al. 1935) and unspecific (Paton 1937) that the test is not in its present form acceptable. Thompson (1938) has recently reviewed the literature and, using an "endotoxin" of the organism, has reported results which, while they show some parallel between a positive reaction and a recent or distant attack of pertussis, still give a high proportion (30 per cent.) of apparently non-specific positive results.

HÆMATOLOGICAL TESTS

The total and differential white cell count is not sufficiently used, even in fever hospitals, for the diagnosis of pertussis. The significant blood picture is said not to occur in the early catarrhal stage; but in the second or third week of the disease, when the diagnosis may still be in doubt, a white cell count of *10,000 per c.mm. over the normal for the age and a lymphocytosis of 70–80 per cent.* is in the presence of a suspicious cough usually diagnostic of pertussis. The relative lymphocytosis natural to young children must, of course, be kept in mind and the possibility of lymphatic leukæmia excluded. A blood examination is particularly helpful at clinics and out-patient departments or in private practice where a quick diagnosis is often so essential. If, in addition, it is possible to do an erythrocyte sedimentation-rate, the finding of a normal or retarded reading makes with the leucocytosis and suspicious cough a triad of symptoms practically pathognomonic of pertussis (Gold and Bell 1936).

Therapeutic Measures

Pertussis is a disease of which it may be said that the multiplicity of remedies is an index of therapeutic failure. Most physicians agree that abundant fresh air is essential—aeroplane trips have been recommended as a cure. To control the spasmodic cough many sedatives have been used—in particular belladonna, benzyl benzoate, ephedrine, ether (usually in oil per rectum), and latterly Luminal which in addition is recommended as a gastric sedative for children who vomit a great deal. Of specific neasures, the choice lies between vaccines and human serum, since only abortive attempts have been made to produce and use therapeutic antisera from animals. The consensus of opinion in this country is unfavourable to the use of vaccines in the treatment of pertussis; when given in the paroxysmal stage they may even cause an increase in the frequency and severity of the spasms (Begg and Coveney 1936). In America, too, Sauer (1933b) could find no amelioration of symptoms either in mild or severe cases treated with vaccine. Yet Madsen states that "Danish doctors are practically unanimous in claiming that treatment (with vaccine) will shorten the disease and render it much milder." One has heard similar expressions of opinion from doctors at home, and although the favourable testimony of practitioners is, in the absence of adequate controls, to be critically received the therapeutic exhibition of vaccines in the *early* stages of pertussis—preferably I would suggest in small doses frequently repeated—should not be discouraged. Some support for this view is given by Thompson (1937) when, following treatment with pertussis "endotoxin," he observed amelioration and shortening of the infection in a

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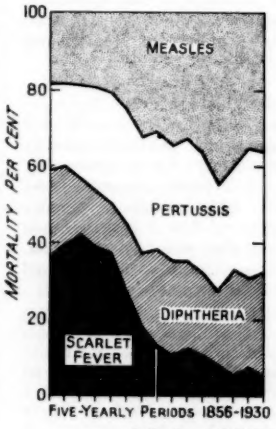

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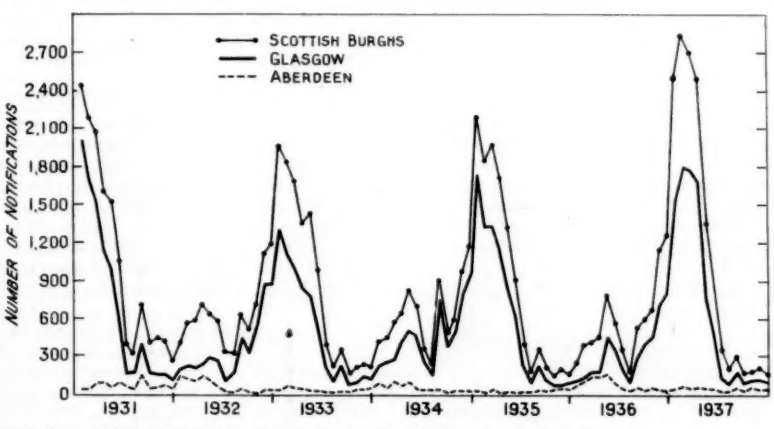

FIG. 2.—Relative percentage mortality from measles, pertussis, diphtheria, and scarlet fever.
FIG. 3.—Notifications of pertussis in the principal Scottish burghs and in Glasgow and Aberdeen.

group of early cases but no effect among those in whom the disease was well established. His findings were well controlled.

The use of human serum or blood from convalescents or adults in the treatment of pertussis has been fully reviewed by Smith (1936). Convalescent serum is difficult to obtain in bulk since most of the victims are young children. Adult serum or blood given in the catarrhal stages in doses of 20–40 c.cm. seems to have some beneficial effect, although care must be taken not to confuse its usefulness in prophylaxis with its therapeutic value. In view of the encouraging results, however, it is most desirable that attempts be made to produce an efficient antiserum from the horse or other animal.

Meanwhile the main objective in the treatment of pertussis is the prevention of serious complications such as broncho-pneumonia and enteritis and to this end careful nursing of the child in the early days of the infection is most important. The continuous supervision which young children require may best be had in hospital, although even there it is frequently not realised that twice as many staff are required to nurse whooping-cough as are needed for scarlet fever. Cross-infection, the bugbear of fever hospitals, is not now such a serious problem, since increased isolation accommodation and measures for passive protection against measles, diphtheria, and scarlet fever have become available. A tendency to fibrosis and bronchiectasis following pertussis or its pulmonary complications may be partly overcome by postural and breathing exercises. Follow-up clinics for such cases after dismissal from hospital would probably be of considerable benefit.

Measures of Control

Although attempts to control or reduce the incidence of respiratory infections by ordinary hygienic measures (excluding artificial immunisation) have failed, except in the case of pulmonary tuberculosis, much may be done to mitigate the attack as has been well shown in measles.

PROTECTION OF THE YOUNG CHILD

With pertussis, as with measles, the infection is most severe in children under two years of age and every effort should be made to protect them from the disease. Such efforts require early diagnosis, a knowledge of the period of infectivity, and means for temporary immunisation. Early diagnosis is difficult and will remain so until a much wider use is made, as in Denmark, of the cough-plate method. Unfortunately, the affected child is most infectious during the catarrhal and early spasmodic phase and may have already infected intimate contacts before anything is done. Much, however, may be done if mothers are impressed by doctors and health visitors with the need for trying to prevent close contact between an older child with catarrhal symptoms and younger members of the household. If pertussis is suspected, the child should be immediately isolated—in poor class homes by transfer to hospital—and any children under four years of age should be given an intramuscular injection of 10–20 c.cm. of the parent's blood.* Or, as Madsen recommends, vaccine may be given in increasing doses on 4–5 successive days. In hospital practice, cross-infection of a ward with pertussis is not usually a serious problem since its infectiousness does not compare with that of measles or chicken-pox. Harries (1935) in his Milroy lectures quoted 23 separate introductions of pertussis into wards without any secondary cases, while Donald has recorded numerous patients wrongly diagnosed as pertussis and nursed in the pertussis wards without developing the infection. Thus it appears that intimate contact such as occurs at home and in school is usually required for transmission of the disease.

The lay and medical public require further education on the limited period of infectivity of pertussis. If the child is well and free of respiratory complications, he should not be kept in isolation after the fourth week of the disease. Although still whooping he may safely be dismissed home from hospital or, in the case of older children, be allowed to return to school. Should there be any hesitation about this procedure, the "release" cough-plate (2–3 exposures at daily intervals in the fourth week) may be used to relieve the doctor of his doubt and so reduce the child's period of absence from school by two weeks. At present six weeks is the standard period recommended by the Ministry of Health and Board of Education.

PROPHYLACTIC IMMUNISATION

If pertussis cannot be controlled by ordinary hygienic measures, the evidence available to-day suggests that its incidence may be considerably reduced and the severity of attack attenuated by prophylactic immunisation. This evidence we owe largely to the medical men on the Faroe Islands (Madsen 1937) and to Sauer and others in America, stimulated no doubt by the experimental work of Leslie and Gardner (1931) in our own country.

The latter workers, starting from the observation of Bordet that freshly isolated strains of *B. pertussis* were not agglutinated by antisera prepared with old stock cultures, showed that this organism, like so many other species, becomes "rough" with repeated subculture on unenriched media and that vaccines produced from "smooth" strains (freshly isolated or maintained on blood-containing media) are required to protect guinea-pigs against fatal doses of the living organism. The main difficulty in appraising the value of prophylactic vaccination against pertussis in the human is the lack of suitable control material. So many children who are immunised are not subsequently subjected to intimate contact with the infection that it requires large numbers and a careful follow-up for one to two years to obtain statistically significant figures.

This difficulty was largely obviated in the experiments on the Faroese who are visited by an extensive outbreak of pertussis once in five or six years. The record of the 1929 epidemic is shown in the Table.

IMMUNISATION AGAINST PERTUSSIS IN THE FAROE ISLANDS EPIDEMIC OF 1929

Nature of attack.	Vaccinated.		Unvaccinated.	
	No.	Per cent.	No.	Per cent.
Not attacked ..	458	25	8	1·8
Mild	1336	73	225	50
Moderate	29	2	170	46
Severe	8		35	
Fatal	1	0·05	8	1·8
Total ..	1832	—	446	—

The vaccine was made from recently isolated strains and the total dosage given was 22,000 million organisms (0·5, 0·7, and 1·0 c.cm. of a 10^{10} organisms per c.cm. vaccine at 3–4 day intervals). Local reactions to pertussis vaccine are usually mild

* Meader (1937) has estimated from a well-controlled series that about three-quarters of family contacts given 10 c.cm. of convalescent serum are temporarily protected.

and general upset rare. Vaccination was begun shortly before the onset of the epidemic and it was estimated that the protective effect lasted for over two months. From the Table it may be seen that 25 per cent. of the inoculated escaped infection compared with 1·8 per cent. of the uninoculated, while among those attacked the infection was moderate or severe in 46 per cent. of the unvaccinated and in only 2 per cent. of the vaccinated group.

To the cynic it may seem a condemnation of prophylactic immunisation that something like 100 per cent. of the inoculated community were not completely protected but to the practical hygienist the lack of absolute protection may appear as a godsend, since an attenuated attack is better than none in conferring on the child a fairly solid immunity. Sauer (1933a, 1933b, 1937) has used larger doses of vaccine grown on human blood (2, 3, and 3 c.cm. of a 10^{10} per c.cm. vaccine at weekly intervals) in attempts, apparently highly successful, to produce a more complete immunity.

OUTLINE OF A DESIRABLE EXPERIMENT

If then the value of prophylactic immunisation against pertussis is admitted—and adverse reports in recent years have been few—how may it best be adapted for use in this country? It is probably desirable first to try its effect with controlled groups of children and for this purpose child welfare centres could be utilised since the optimum age for pertussis vaccination is 6–12 months. To carry out such an experiment successfully compulsory notification † of cases is essential and this should be the first step in the programme. The London County Council has recently recommended the compulsory notification of measles and whooping-cough on a uniform basis throughout London, believing that the psychological effect on the general public (a notifiable disease being regarded as much the more serious) will result in a greater readiness to call medical advice so that the resultant earlier diagnosis and treatment will help to minimise the serious complications and sequelæ of these infections. Similarly, if immunisation on a large scale is anticipated, it should be done on a uniform basis throughout the country and from analogy with diphtheria should embrace at least 60 per cent. of pre-school children. Otherwise there may be benefit for the inoculated but no significant reduction in the general incidence of the disease. In the unlikely event of any system of compulsory vaccination, propaganda of the type that has been used in diphtheria is the most hopeful method of reducing the incidence and mortality of pertussis.

I am indebted to Dr. Th. Madsen, Director of the State Serum Institute, Denmark, for permission to adapt Figs. 1 and 2 from his Abraham Flexner lectures, and to Dr. Peter McKinlay, Department of Health for Scotland, for extracting the data referable to notification of pertussis in Scotland.

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SPECIAL ARTICLES

CONVALESCENCE ON THE COAST*

BY R. FORTESCUE FOX, M.D., F.R.C.P.
AND
WYNDHAM E. B. LLOYD, M.R.C.S., D.P.H.

THE value of medical treatment on the coast was first seriously brought to the notice of the profession by Dr. Richard Russell of London in 1750.[1] Mainly as a result of his advocacy and that of Drs. Lettsom and Fothergill, the practice of sea-bathing was established in England before the end of the century at many seaside resorts. The Royal Seabathing Infirmary at Margate, founded in 1796, became a world pioneer for marine hospitals, and was followed by the Royal Northern Sea Bathing Infirmary at Scarborough in 1812. In the ensuing years the invigorating effects of sea-air and bathing became generally recognised, but the high cost of living and travel prohibited their general use, so that the coasts, as well as medicinal waters, became and remained for a long time, and even to the present day to a large extent, the prerogative of the rich. The delicate children and invalids of the great cities, and still more the crowded and debilitated factory workers, seldom saw the sea or the country.

The great movement for the establishment of convalescent homes at the seaside began in England just a hundred years ago. John Robertson, a surgeon in Manchester, may be called the "father of the convalescent home." He lamented the prevalent ill health, and the distresses which resulted from it, in a great manufacturing city, where nearly three-quarters of the population required medical assistance every year. He found that for many of them no improvement could be obtained without getting them away from unfavourable conditions. He did not hesitate to claim that the feeble and disabled deserved and required, as much as the opulent, the means of recovery. It is interesting that even at that period Robertson should have advocated convalescence at the coast both on economic and health grounds.[2] His impressive and convincing advocacy had an immense influence. What was true of Manchester was true of all the great manufacturing centres. The movement which followed in many industrial areas made a good beginning in bringing ailing people to the coast and so mitigating the worst evils of industrialism in England.

† In a personal communication the M.O.H. of Battersea, where an Order making notification of the first case in a household compulsory has been in force since 1922, states that the system is conscientiously carried out by the practitioners and is of undoubted value in initiating early treatment.

* Presented to the International Conference on Thalassotherapy held at Montpellier, June, 1938.

[1] Russell, R., Dissertation on the Uses of Sea Water in Diseases of the Glands, London, 1750.

[2] Robertson, J., *Edinb. med. surg. J.* 1837, **48**, 326.

PRESENT CONDITIONS: NEW DEMANDS

During the latter part of the nineteenth century, and more than ever in the twentieth, there has been in England, as in all countries bordering on the sea, a veritable summer exodus to the seaside. This now affects all the great centres of population. Who can measure the influence upon the national health of this centrifugal movement to the coast? Within this period convalescent homes in large numbers, many of them attached to city hospitals, have been opened at the seaside. Those who have visited these often quite small and unpretentious places are well aware of the surprising change which is produced in a few weeks in the condition of their inmates, especially children, simply by the marine climate and systematic rest and without other medical treatment—very often amounting to a physical and mental transformation. Another important movement in the same direction has been the establishment of seaside schools, some of them intended for subnormal and delicate children. The long coast-line of the British Islands, with its stimulating northern airs, tonic on the east coast and sedative in the west, is being recognised as the greatest of the natural health assets of the country.[3] The figures supplied by the British seaside resorts and by the railways show that the seaward movement is rapidly increasing year by year. It brings also large numbers of convalescent and ailing people, and especially subnormal children, with much larger numbers of people who now make a practice of going every summer to the coast for holidays and recreation. According to the estimates made by the British Health Resorts Association,[4] the annual summer visitors every year can now be counted in millions, and from 30,000 to 40,000 delicate children are given accommodation in convalescent homes.

It is evident that the new privilege of "holidays with pay" for wage-earners, which is now coming into operation, will greatly increase the influx of visitors to the seaside, and that in popular places the overcrowding will be difficult to handle. Unfortunately for seaside resorts, under the existing traditional holiday arrangements, the vacation both of the schools and in many industries does not begin until August. Already this imposes a great strain upon accommodation at the coast, with the inevitable result—short seasons, indifferent service, and high prices. The better spacing of holidays has therefore become a burning question.

THE BEST SEASON AT THE SEASIDE

It is well to remember that there are no grounds for assuming any special advantages in August and September for an invigorating change of air. On the contrary, there is good evidence that the longer days of June and July are to be preferred for the annual cessation of work. Nature is at her best, and human nature begins to rebel against confinement in the cities. At all events for delicate children the summer is more stimulating than the "fall" or autumn. In regard to children, careful observations on the influence of the seasons have been made on the island of Föhr, on the other side of the North Sea. Large numbers of non-tuberculous children from Hamburg and Berlin are under care in successive groups during the whole year, and it is stated that the optimum results are very often obtained in the cold weather of winter.[5] Children are no doubt more tolerant of changes of temperature than adults. In England it has often been noted that middle-aged or elderly invalids may benefit from a sojourn at the coast in the late autumn, with or without a course of baths, as a preparation for winter cold; and also in March or April, to escape the danger period of the spring.

Wintering stations on the coast.—In the last edition of the Handbook of British Health Resorts detailed information was published in a tabular form from a large number of winter resorts on the coast. It covers the five months from November to March, and exhibits the climatic data in a somewhat novel way. In all the localities each month is treated separately, showing: (1) the bright sunshine (total hours and days); (2) the daylight rainfall; (3) the range of temperature; (4) the days when the maximum stood above 50° F. ("open-air days"); as well as (5) the direction of the wind. In circulatory and respiratory disorders especially, great importance attaches to the daily range of temperature in the colder months of the year. It is characteristic of the British coastal climate that this diurnal change of temperature between day and night is very slight, especially in the south and south-west. The average range of winter temperature is only 8·8° F. in the West of England, as compared with 19° in the Alps, 18° at Nice, and 28° at Assouan. In the ascent of Everest a fall of 40° in four hours has been recorded. The brisk "reaction to cold" in young and vigorous men compensates even these extremes of temperature. But even on the English coast some defence against the vicissitudes of wind and weather is essential for the invalid. The warm humid winter in the west, with a minimum of these daily oscillations, is regarded as protective—alleviating disturbances of circulation and breathing, minimising the expenditure of energy, and favouring the prolongation of life.

STIMULANT AND SEDATIVE MARINE CLIMATES

A broad distinction must be drawn between the medical values of the east and west coasts. On the eastern aspect of the British Islands the climate as a whole is stimulant or tonic; in the south-west and west it is sedative. The physiological reactions of these two forms of climate have been roughly and generally described as *accelerating* in the east, that is to say stimulating and increasing metabolism, circulation, and nervous energy, and *retarding* in the west, that is to say slowing the various vital processes and so economising the energy of the body. The importance of these cardinal therapeutic objectives in the case of failing health and chronic disease is better recognised in the choice of drugs than in the choice of physical remedies, climate, and surroundings. There is in England a great variety of local climates. They differ in many ways, such as aspect, shelter, wind, temperature, and humidity. No general rule is therefore possible, for in all climates both stimulant and sedative influences are combined.

CARE OF DELICATE CHILDREN ON THE COAST

The restorative treatment of (non-pulmonary) *tuberculous* children at the seaside has been carried out with admirable success at Berck-sur-Mer and elsewhere in France, and is now firmly established in England. But the incidence of this form of tuberculosis is of late years so much reduced that the number of such children requiring treatment, at Margate for example, has greatly diminished. Children *without tuberculous disease*, however, who suffer from chronic dyspepsia, malnutrition, anæmia, or rheumatic, catarrhal, nervous, or respiratory disorders are found in great numbers on all parts of the coast. They

[3] Fox, R. F., Centres of Convalescence: the Advantages of Therapeutic Specialisation, *Arch. med. Hydrol.* 1932, **10**, 73.
[4] Handbook of the British Health Resorts Association, 1938.
[5] Häberlin, C., *Brit. med. J.* 1931, **2**, 331, 348.

can be seen on the beach, often blue with cold, coming from crowded lodgings, and endeavouring to join the vigorous ones in all their occupations. It is known also that many such children are very sensitive to local climatic influence, and, as we have seen, quickly respond to good care and wholesome diet in the seaside convalescent home. But the medical profession and the public stand greatly in need of precise information in regard to these many common forms of delicacy in ailing children. It is now possible to obtain precise measurements of the physiological reactions of subnormal children during their stay at the coast. Even a few hours after arrival, effects can be traced in the gastric secretion and circulation, and it is known that within a short time important changes take place in metabolism, cutaneous functions, the blood picture, and the reaction to cold. Such observations in children with impaired health are obviously of no little importance, if only as a guide to treatment. Briefly, it is now possible to report upon the progress of convalescence on the coast as accurately as upon acute illness. As in other branches of medicine, so here, accurate findings must take the place of general impressions, and may or may not support and justify our clinical observation. Undoubtedly a new science of the convalescence of children on the coast is within sight, which might well be followed by a new practice, on a much larger scale than anything yet witnessed. It is known that many functional disorders in early life are the precursors of lifelong delicacy, if not of more serious disease. If the same care and investigation that have been devoted to tuberculous children were given to these various categories of non-tuberculous disorders, it would in our opinion open a new and fruitful branch of preventive medicine.

PLANS FOR RESEARCH

A committee was founded in London a few months ago to establish centres of research for delicate children on the coast. It has already drawn up a first programme of investigation, beginning at Margate, where the Royal Sea Bathing Hospital has kindly offered accommodation for a laboratory. As already stated, the delicate child is extraordinarily responsive to the external impressions of sunshine, fresh air, wind, and other climatic factors. The first and main objective of the committee is to measure the physiological reaction produced by the marine climate, east and west, in various forms of ill health. It is believed that observations of this character in various parts of the coast will establish some important principles in the climatic treatment of disease. In these bio- or medico-climatic observations the measuring instrument will be the human body.

COÖPERATION WITHIN THE PROFESSION

A MEETING of the Metropolitan Counties branch of the British Medical Association was held at Tavistock House, Tavistock-square, on June 24th.

Sir WILLIAM WILLCOX, opening a discussion on coöperation, said that it was only in comparatively recent days that the importance of public health and preventive work was recognised. The history of fever hospitals in London was an illustration of this fact. In 1801 in London housing, health, and social conditions generally were so deplorable that citizens met together and decided to open a subscription fund to start the London Fever Hospital. Since the passing of the Public Health Act, 1848, the conscience of the nation had gradually developed, until now we were perhaps ultra-health-conscious. The process of evolution by carefully considered advances would give the best results. Sir William discussed the changes brought about by the Local Government Act, 1929, which had led the way to coöperation between voluntary and municipal hospitals. The latter had been vastly improved; they could do the best for the patients, irrespective of financial anxieties, and call in consultants and specialists as required. The voluntary hospitals had led the way in medical and nursing education and in research, and had helped the municipal hospitals by providing consultant staffs for them. Coöperation was also essential between the public health services and the medical profession, especially between the medical officer of health and the general practitioner. During the last 30 years the scope of the work of the medical officer of health had greatly increased. Besides infant welfare and tuberculosis clinics and the development of a fine school medical service, there were now clinics for venereal diseases, fractures, antenatal and postnatal work, and artificial light therapy, as well as immunisation centres. In all these branches the medical officer of health had to enlist the coöperation of various experts. The Ministry of Health had encouraged the development of consultative advisory medical committees to help him in his work. The medical officer of health should be the chairman of such committees, which should meet regularly at definite but not too frequent intervals, special meetings being convened at the discretion of the chairman. The services of general practitioners should be enlisted as far as possible in staffing the various clinics; and it was of the utmost importance that practitioners, whether general or consultants, should equip themselves thoroughly for this work by special study and should keep their knowledge up to date.

Dr. JAMES FENTON, president of the Society of Medical Officers of Health, drew attention to some of the difficulties attending coöperation, pointing out that when a doctor entered the local government service he was no longer a free agent, and the degree of coöperation with his colleagues was not always within his control. Procedures might differ so widely in different boroughs that comparisons were not fair. Dr. Fenton described some of the schemes which had been carried out in Kensington, such as the diphtheria immunisation scheme, under which 84 doctors in the borough had been placed at their request on the immunisation panel. In his view maternity and child welfare centres should be entirely advisory, not treatment, centres. Though the whole-time system was much easier to work, as far as possible part-time services of the general practitioners should be utilised. Grants for food, milk, convalescence, and so forth in Kensington were made in necessitous cases quite as freely on the general practitioner's medical certificate as on that of the council's own medical officers. Coöperation meant goodwill on both sides. As to the functions of a consultative committee of general practitioners, this could not take the place of the expert from the Ministry of Health. Consultative committees were of two kinds: (1) an emergency committee, as in Croydon; and (2) a standing committee. He regarded the local executive committee of the British Medical Association as his standing committee; and he would object very strongly to the ad-hoc establishment of an independent medical committee.

Dr. ALFRED COX (secretary, London Public Medical Service) said that there was no difference of opinion as to the end for which they were all working—the best interests of the patient—and many problems would be solved if this were always kept in mind. He believed that the public medical service and other forms of contract practice were the best possible examples of coöperation. The public medical service had a wide scope; the doctor's remuneration was fixed, was independent of the number of visits paid to or by the patient, and he was therefore directly and financially interested in getting the patient well. His direct interest in preventive medicine was of the greatest possible use to public health. The senseless gap between the preventive and curative sides of medicine had steadily widened during recent years. It was important that the medical officer of health should get to know each general practitioner in his borough, and claim the help each could give him. He should be able to assure the doctor that no patients would be dealt with at the municipal centres who had a doctor of their own; and that milk and other foods would be granted readily to his patients on his own certificate.

Dr. ALLEN DALEY (principal medical officer, L.C.C.), discussing proposals for a national maternity service, said that the L.C.C. aimed at the coördination of existing national and municipal services. The main proposals were that one qualified medical practitioner should have continuous responsibility throughout the period of maternity for the normal medical care of the woman before and after childbirth. The local authority's centres or clinics would under this scheme become centres where cases might be sent by the chosen practitioner for consultant or specialist advice or treatment. Any registered medical practitioner should have the right to be enrolled on any list drawn up for this purpose, and the prospective mother should have full right of choice from this list. After a warm tribute to the work of part-time officers in the school medical service, Dr. Daley urged the necessity for close coöperation in the establishment of a domiciliary midwifery service, adding that nothing could be worse for the profession than disputes among doctors.

Lord DAWSON said that the reasons for difficulties in coöperation should be explored. Nothing was more striking than the widening which had taken place over the medical front. The trouble was that organisation had lagged behind that widening. For many years before 1929 the voluntary hospitals were becoming inadequate in numbers to meet the hospital needs of the community. After 1929 there came into existence the rate-aided hospitals, most of them converted, a few of new construction. The founding of municipal hospitals was sound, but it was a serious error of statesmanship not to have set up at the same time in each community a coördinating hospitals authority, either by machinery similar to that adopted in the sphere of education or by some machinery specially devised. The moment local authorities extended their responsibilities from preventive medicine to hospital administration they were taking on something for which they were imperfectly equipped and without the means of taking advantage of the experience accumulated by voluntary hospitals. The L.C.C. was a vast body in a specially favourable position to organise new hospitals. But in the country as a whole the average town had two sets of hospitals—one under voluntary management with a long experience behind it, and the other, rate-supported, under professional advisers, able men trained in preventive medicine, who had been called upon to undertake at short notice the care and direction also of curative medicine. Side by side with these two sets of hospitals grow up two sets of vested interests; and that dangerous thing for public welfare, a sense of jealous possession. If physicians knew too little of preventive medicine, those in the public health service knew very little about treatment. Surely in the public interest these forces should be united in an organised contact which would develop the habit of coöperation. The local authority should have at its disposal as a matter of habit the best advice culled from the whole medical community. There should be in each district a professional authority to whom the members of the public could apply for the considered and collective opinion of the medical profession on such topics as hygiene, food, clothing of infants, and countless other subjects for teaching on which the people too often depended on the popular newspapers. The voluntary hospitals for generations had had medical councils. There professional questions were debated and decisions arrived at and placed before the administration. Whether the administration accepted the advice or not was its own responsibility. Some towns had instituted a hospitals advisory authority on which sat representatives of the municipality and of the voluntary hospital, of doctors, and of the medical faculty of the university. Such a body could speak with strong authority but did not in any way traverse the constitutional position of the local authority. It was necessary to organise the profession, to coöperate with the object of establishing an authoritative body whose opinion would carry weight.

Dr. E. A. GREGG (chairman, London Panel Committee and Insurance Acts Committee, B.M.A.) pointed out that the work of the insurance practitioner was governed by regulations. He thought they were justified in claiming their branch of service as an outstanding example of coöperation, but even so there had been in recent times difficulties associated with their work. The accusation was sometimes made that the insurance practitioner sent his patients to hospital to get rid of them. The truth was that they often had to be sent to hospitals for treatment in these days. Pneumonia patients, for example, used to be nursed at home, but now facilities for adequate treatment could only be obtained in hospital. Institutional treatment was likely to increase in the future. The London Panel Committee had long provided post-graduate courses for doctors on the preventive aspect of medicine. He thought the panel committee in London might be more largely used in securing a better coöperation between various sections of the medical profession.

Dr. G. C. ANDERSON (secretary, British Medical Association) said that the keynote of the discussion had been struck by Lord Dawson. It was a vital necessity to establish in every area of the country a live body of the profession from whom advice could be sought. The British Medical Association was recognised by every government department in the country as such an authoritative body, and not one of these departments would think of bringing forward any measure that affected public health without ascertaining the views of the Association. What they now got centrally they were asking for locally. Many developments were likely to take place in the hospital field, extension of contributory schemes, further development of a provident scheme, and so on. For the proper working out of these there would be need for greater coöperation, and some attempt at this had got to be made now.

SCOTLAND

(FROM OUR OWN CORRESPONDENT)

GASTRIC SECRETION

Two lectures were delivered in Edinburgh University last week by Dr. B. P. Babkin, professor of physiology at McGill University, Montreal. In the first lecture, on the regulation of the secretory activity of the gastric gland, Prof. Babkin described the anatomical arrangement of the different secreting cells and discussed the nervous influences controlling secretion. He said that feeding was not associated with gastric secretion after vagotomy and that electrical stimulation of the distal end of the cut vagus with weak currents produced profuse alkaline secretion containing much mucin whereas when strong currents were used the secretion was acid and contained some pepsin but little mucin. It was suggested that the vagus might contain different fibres supplying different cells. Stimulation of the splanchnic nerves after vagotomy induced a flow of alkaline mucous secretion from the pyloric glands. The chemical phase of gastric secretion was divided into three parts. The hormone-like substance gastrin, produced in the pyloric part of the stomach by the presence of food in that part even when it was isolated from the rest of the stomach, could be extracted from the pyloric part only, whereas histamine could be extracted from other parts too. Food substances, notably extractives, acetic acid, alcohol, fatty acids, and soaps, stimulated secretion probably after absorption and not through the mediation of a hormone. Carbohydrates and choline by themselves were not stimulators but in the presence of other substances such as alcohol, animal protein, and fat caused great increase in the flow. Gastric flow also resulted from central stimulation by amino-acids and insulin. This stimulation was unobtainable after vagotomy or atropine, although in the case of insulin hypoglycæmia was produced. Prof. Babkin said that histamine or some allied substance which could be extracted from the stomach particularly after vagal stimulation was a specific stimulator of the parietal or acid-secreting cells and also strongly inhibited the peptic cells. The histamine was probably formed or liberated in the parietal cells by the action of acetylcholine, but the process was local since there was no increase in the histamine content of the blood going to or leaving the stomach after vagal stimulation.

CONDITIONED REFLEXES

In the second lecture, which was entitled "Conditioned reflexes; their significance in the light of recent work," Prof. Babkin dealt particularly with the experimental production and treatment of neuroses in animals. He described methods by which neuroses had been produced in some of the dogs in Prof. Pavlov's laboratory, where Prof. Babkin worked from 1901 to 1910, and in other centres. A dog was conditioned to distinguish between a visual stimulus of circular form which was associated with food and produced salivation, and a stimulus of oval shape which being unassociated with food produced no salivation. When the oval stimulus was gradually changed so that its form more closely resembled that of the circle a point was reached when the process of inhibition associated with the oval stimulus was overstrained, the reflexes broke down and the animal became excited and neurotic. Excitement and neurotic behaviour with failure of established reflexes were also produced by the rapid alteration of positive (salivation-inducing) and negative (salivation-inhibiting) stimuli and by the strong and complicated stimuli associated with a particularly severe storm and flood which endangered the lives of the dogs. Pavlov had divided dogs into groups according to the type of nervous make-up. The "phlegmatic" and "sanguine" types had strong and balanced nervous systems and could not be rendered neurotic. In the "choleric" type inhibition was weak and excitation neuroses were easily induced. In the "melancholic" type both excitation and inhibition were weak though the latter predominated and inhibition neuroses could be produced. Breakdown of the reflexes was also readily obtained in male dogs after castration. An interesting phenomenon were the localised neuroses. Some dogs were "sensitive" to the stimulus of a metronome so that in testing a series of previously established reflexes to various stimuli it was found that the dogs became greatly excited by the metronome and subsequent reflexes were inhibited. Neurotic dogs could be treated with sodium bromide which stimulated the process of inhibition. The "choleric" type of animal could be cured with doses of 2–3 g. a day for ten days but smaller doses had to be used for the "melancholic" type which responded less well. In this type small doses of Sodium Amytal, Nembutal, Avertin, or alcohol produced "disinhibition" only for 24 hours. Large doses of alcohol over prolonged periods temporarily depressed or abolished conditioned reflexes.

IRELAND

(FROM OUR OWN CORRESPONDENT)

FURTHER REPORT OF THE CENSUS OF 1936

A GENERAL survey of the results of the census of the Irish Free State taken in 1936 appeared in August of that year. The detailed report is now being issued by the statistics department of the Department of Industry and Commerce, and the first volume appeared last week. The population of the Irish Free State area as shown by the census of 1936 was 2,968,420; this was less by 3572, or 0·1 per cent., than the population as shown by the previous census. It is the lowest population recorded in the history of the area, the highest being 6,529,000 in 1841. The decrease since that year has been approximately 3½ million, or 55 per cent. This is the first census which shows an increase in the number of males. Since 1911 there has been a preponderance of males over females, the proportion in 1936 being 1000 males to 952 females. The diminishing proportion of females is believed to be due to an excess of female over male emigrants in recent years.

The most notable feature in the report is the steady and increasing migration from the rural to the urban areas. Since 1926 the aggregate population of Dublin City and County has been enlarged by 16 per cent., the greatest decennial increase in its history. Taking the entire urban population, it shows an increase of 10 per cent. in the decade from 1926 to 1936, while the rural population shows a decrease of 5 per cent. In 1936 57 per cent. of the population lived outside towns or villages, as compared with 61 per cent. in 1926. The greatest density of population is in the Mountjoy Ward of the city of Dublin—185 persons per acre. Nowhere outside Dublin does the density in any area exceed 100. In Glasgow the highest density in any area is 53 in

Glasgow parish; in Liverpool there are eight wards with densities over 100, the highest being in Netherfield (227); in London the highest is Southwark with 152.

MEDICAL MEN IN THE DÁIL

The election results show that there are eight medical men as members of the newly elected Dáil. Six of these are supporters of the Government—Drs. M. Brennan, F. Humphries, J. B. Lynch, J. Ryan, J. A. Tubridy, and F. C. Ward. All of these were previously members except Dr. Brennan, who is a newcomer as a deputy for Co. Sligo; Dr. Lynch was not a member of the last Dáil, but was of the previous one. The only medical man in the Fine Gael party is Dr. T. F. O'Higgins, who for several years past has sat on the Opposition front bench. Dr. J. Hannigan, who came to the Dáil first a year ago, has again been returned as an Independent for a division of Dublin City. Regret is felt for the failure of Dr. Myles Keogh to secure election this time. He had been representative for many years, with intervals, for South Dublin.

AUSTRALASIA

(FROM OUR OWN CORRESPONDENTS)

NATIONAL HEALTH INSURANCE IN AUSTRALIA

THE disagreement between the medical profession and the Commonwealth Government on the question of capitation fees will not be an obstacle to the appointment of between 25 and 30 doctors to supervise the operation of the medical services under the new national insurance scheme. They will be selected from the ranks of general practitioners in each state, and will be salaried officers of the Commonwealth Government. It will be the duty of these regional doctors to smooth out difficulties in the operation of the scheme, and to assist practitioners generally in running the insurance service. Pending the report of the Royal Commission on the inclusion of dependants of insured persons in the scheme the Government proposes to institute a voluntary subsidised system under which medical benefits will be extended to the wives and children of insured men. More than 700,000 families will be affected and the cost to the Commonwealth is estimated at about £175,000 a year. The extension of medical benefits will cost contributors who wish to enrol 6*d*. per week and the government will contribute 5*s*. per head per year for every married contributor. Practitioners will receive 18*s*. per year for every insured family brought into the scheme by voluntary contribution, irrespective of size, plus the capitation fee for the compulsory insured worker. This is based on the friendly societies family unit of 3·2 persons per family, for which doctors in New South Wales, under the friendly societies' schemes, receive 29*s*.

It is now considered unlikely that the national insurance scheme will begin to operate, as was originally proposed, as soon as January, 1939.

VITAL STATISTICS OF MAORI POPULATION IN NEW ZEALAND

The unhygienic conditions under which the Maoris have lived up to the present are deemed responsible for the very unfavourable comparison of Maori vital statistics with European ones in New Zealand. While the infantile mortality-rate for Europeans has been reduced to 30·96 per 1000 live births, the lowest on record, the Maori rate for last year was 109·92. In some diseases, notably tuberculosis and enteric fever, the Maori death-rate is ten times the European rate. The Maori birth-rate is 43·79 per 1000 of population compared with 16·64 per 1000 among Europeans. On the other hand the Maori death-rate is 19·32 per 1000 against the European figure of 8·75. The chief difficulties met with by the Health Department of New Zealand in its attempt to help the Maori are defective sanitation and arrangements for isolation, faulty hygiene, and malnutrition. In some district the Maoris prefer to hide their typhoid cases rather than call in nursing or medical aid. One epidemic was due to the fact that the first case was hidden for three weeks, a child being transferred from house to house in order to elude the visiting nurse. The Government has started a campaign aiming at a higher standard of sanitation among Maoris, the promotion of new housing schemes, and the provision of additional nurses and health inspectors.

A MEDICAL SCHOOL FOR NATIVE DOCTORS

The Fijian colony covers an area of about 7000 square miles and consists of a number of islands of volcanic origin in the South Pacific ocean, with Sydney almost 2000 miles away, and Auckland at a distance of over 1000 miles. In spite of their remoteness from other centres of civilisation, the islands possess an excellent public health administrative authority with an enthusiastic medical staff interested in all branches of modern preventive medicine, working in conjunction with the Central Medical School at Suva. This school trains selected students as native medical practitioners to work in their own islands.

The school is staffed by a director of clinical studies, a principal, and a Government pathologist. Students come from the Gilbert and Ellice Islands, Cook Islands, Loaga, and Western Samoa; each of these administrations is patiently building up a native medical practitioner service at the average rate of one qualified man per annum in each island. Revision courses for former students are also being provided. Already there are three post-graduates attending such courses, and forty medical students have been registered at the medical school. Facilities for regular exercise and physical training are available, and the vacations are generous in view of the long distances which some students have to travel to reach their homes.

UNITED STATES OF AMERICA

(FROM OUR OWN CORRESPONDENTS)

STATE CONTROL OF MEDICINE

IN view of the conference to be held in Washington on a national health programme the attitude of the medical profession in regard to the Government's responsibility for national health needs to be clarified.

Last year at the annual meeting of the American Medical Association at Atlantic City a resolution adopted quoted the board of trustees to the effect that "it has been repeatedly said that public health work is the first problem of the state."[1] Dr. Morris Fishbein, speaking in Philadelphia, pointed out that all leaders who have ever had anything to say about public health agree that the health of the people is a direct concern of the Government.[2]

In his presidential address to the Association in San Francisco on June 14th, on the aims of the medical profession as they relate to the public,

[1] *J. Amer. med. Ass.* 1937, **108**, 2220.
[2] *Weekly Roster and Medical Digest*, Feb. 12th, 1938, p. 752.

Dr. Irvin Abell qualified if he did not renounce this doctrine.

Organised medicine, he said, from prolonged and intimate observation is fully cognisant of the social and economic needs that lie so heavily on the indigent and the low income groups; while willing and solicitous to do its share in their care and rehabilitation by supplying good medical service to those who require it, the profession of medicine does not feel it a responsibility to initiate or sponsor measures looking toward social and economic reformation. At the same time it resists efforts and proposals that would include and regiment its services under lay or political control for the accomplishment of these ends.

Since Government control is both "lay and political" it appears that the president of the Association is opposed to the Government direction of medical care. He eulogised, justly, the efforts made by the Association on its own initiative to raise the standards of medical education and hospital practice. He gave credit to the medical profession for the control of communicable diseases, mentioning specifically typhoid fever and tuberculosis, without acknowledgment of the part played by Government in establishing this control. Finally he set out the following list of defects which he believed to be associated with State control of medicine:—

1. There is no decrease in the cost of medical care: the system adds a staggering administrative cost.
2. Public health and preventive medicine are not assisted or advanced.
3. Over-medication is encouraged.
4. The burden of cost is distributed over the low income class, which is least able to bear it.
5. Medical care for the indigent is omitted.
6. Graduate education is not encouraged.
7. The hospital load is increased and hospitals are encouraged to practise medicine.
8. Diagnosis and treatment are mechanical and superficial.
9. Medical service becomes a political issue and its control is placed in the hands of unqualified non-medical workers and organisations.

From a study of the systems of State-controlled medicine in other countries Dr. Abell had gained the impression that these were only a few of their characteristics.

TRICHINOSIS IN THE UNITED STATES

Numerous recent investigations in the United States, many of them based on large amounts of necropsy material, suggest that trichinosis is much more common than has been realised. One examination of 1778 cadavers at twenty-four hospitals in eleven places in the United States showed an incidence of 12·5 per cent. infected with trichinæ. More recently, examination of diaphragms at 1000 autopsies showed 174 to be infected with trichinæ, or an incidence of 17·4 per cent. The hospitals in which these examinations were made were all in the eastern States, but fairly widely distributed. Outbreaks of trichinosis are also being reported more often, although it is becoming obvious that the number of cases diagnosed during life is only an infinitesimal proportion of those infested. One small outbreak reported from central Ohio was confined to six patients and apparently resulted from the eating of one hog. Another outbreak of twenty-five cases in eight households in Los Angeles was attributed to smoked raw ham which had been peddled from house to house. The Bachman intradermal skin test is one of a number of means of making a positive diagnosis during life. Larvæ or adults worms may be detected in the intestine, and larvæ in the lymph, blood, or other tissues. Although any skeletal muscle may be affected, muscles that are especially active and so have a large blood-supply are usually most heavily involved. The symptoms may be divided into three stages: nausea, diarrhœa, and abdominal pain during the development of the worm to maturity in the intestine; muscular pains, œdema, fever, and eosinophilia during the dissemination of larvæ through the body; and regression of symptoms during convalescence.

CURED-CANCER CLINICS

Massachusetts was the pioneer State in the institution of public medical measures for the control of cancer. It now has diagnostic clinics established in 21 different cities so placed that there is hardly a residence in the State more than 25 miles from the nearest clinic. During April last an attempt was made at propaganda by presenting 300 cured cases at each clinic in turn. These were volunteers from a group of more than 1000 persons who have been through the State clinics between 1927 and 1933 and are free from any sign of recurrence five years after treatment. The educational side of the movement is held to have succeeded in persuading patients to seek advice earlier. At present 18 per cent. of patients come to their physician for advice within a month of noticing symptoms, compared with only 12 per cent. in 1933. The average delay is still five months. More than 90 per cent. of the patients attending the clinics have been sent by private physicians. Attendance at the post-graduate teaching clinics has also improved, from 75 physicians in 1933 to 1384 in 1937. Last year 12,454 persons attended the clinics. Of those attending for the first time about one-third were found to have cancer.

PARIS

(FROM OUR OWN CORRESPONDENT)

UNDULANT FEVER IN FRANCE

UNTIL 1914 undulant fever in France was confined to the Mediterranean littoral, but in the first few years after the war it spread inland and invaded some 17 departments in the south and south-east. The research centre at Montpellier, which was established under the auspices of the Rockefeller Foundation eight years ago, has found that the present position of the disease from a public health point of view is highly unsatisfactory. The number of infected departments has now risen to 76 and Brittany is the only large part of France that remains uninvaded. The relative frequency of the two forms of fever has not yet been determined throughout the country, but in the eastern departments only 15–18 per cent. of cases are due to *Brucella melitensis* of bovine origin. This is fortunate, for *Br. melitensis* is usually far more pathogenic to man than *Br. abortus*. The problems of stamping out undulant fever are very different in urban and rural communities. In towns the disease is mainly spread by the consumption of infected milk or milk products, and would almost cease if all suspect supplies were sterilised. But in the country direct contact between man and beast is much the most common means of infection, and there the first necessity is to cultivate more cleanly habits in all who have to handle cattle. Even then the animal reservoirs of infection would still be uncontrolled. Prof. Lisbonne, of the faculty of medicine at Montpellier, has succeeded in effectively immunising guinea-pigs against *Br. melitensis* by means of a vaccine, and the spread of what Nicolle aptly described as "the disease of the future" may ultimately be checked on these lines.

GRAINS AND SCRUPLES

Under this heading appear week by week the unfettered thoughts of doctors in various occupations. Each contributor is responsible for the section for a month; his name can be seen later in the half-yearly index

FROM AN AURAL SURGEON

I

THE Matron at Bradfield, known to all of us as Ma Bullen, was a wonderful old lady. I think we appreciated that even in the 'nineties; but there was one thing for which we used not only to laugh at her but to jeer at her and even to despise her. It hung framed over the mantelpiece in her dining-room, and opposite was a couch on which we sat while having our temperatures taken, which, in those days, took five minutes, so that we had plenty of time to look at the thing. It was a framed precept worked in wool on perforated linen and it ran "A little thing is a little thing, but faithfulness in a little thing is a very great thing." I can see us now, two or three small boys, on the sofa, sitting, with hands under the thighs, swinging our legs, nudging, nodding, giggling, nearly bursting into laughter, so that the thermometers in our mouths were in danger of being broken. Yet of all the things I associate with Ma Bullen, this is that which I remember best and that has been the greatest conscious influence from her in my life. That faithfulness in a little thing is a very great thing is true of all life, and it is one of the foundations of medicine. In surgery it is the grains and the scruples that make the difference between failure and success when these are measured in terms of comfort and relief to the patient. The great surgeons seem effortless in the manner in which they pay attention to them and yet this attention is minute. By a careful study of them we mediocrities can do useful work in the service of the public over many years. A neglect of them is inherent in all bad surgery. When a surgeon is dead the greatest thing that can be said of him is that he never did a bit of bad work. Would to God that many of us had realised and absorbed Ma Bullen's precept early enough to have made this possible.

Not that I had many occasions of studying the precept for I was a healthy youth. I had been there some two years before ever I reported sick. I had been quarrelling, and an opponent had put me down on the class-room floor with a bump that would have cracked most skulls, and then had fallen on my nose. I had a splitting headache and felt I could not stick it. Ma Bullen asked me whether I had any "penal" to do that afternoon and when she had learnt that I had twenty minutes penal drill, which was the routine form of punishment in those days, she said in the kindest voice: "I think you had better do it. You know that when we get into these troubles we have to see them through. Come to me after it is over if the head is still very bad before afternoon school." She hurt me by that; she thought I was a skrimshanker trying to get off a mere twenty minutes drill by a headache.

Many boys, perhaps most, went through a period when penal was normal to them. I was in the middle of this period which with me lasted some two terms. I thought myself lucky not to have "three-quarters." If ever I had none I was almost at a loss to know how to fill in the afternoon. To be accused of skrimshanking a headache for a mere "twenty minutes" was an insult to my mental powers, as well as to my physical ones, and I left her room swearing I would never report sick again.

Yet I recognised the kindliness in her voice. I have often wondered since whether patients have left my consulting-room misunderstanding what I have said as greatly as I did her. So little a thing can make so vast a difference, an intonation of the voice, the misuse of a word, or the wrong estimate of a patient's character, can send them out much worse than when they came in. And not only have they paid a fee for nothing, they have paid one for actual harm done.

* * *

She was a wonderful diagnostician, was that old lady. Once she tracked me down in chapel with a cough, and bundled me down to the sanatorium as she suspected "whoopers." A fortnight later it proved to be so. On one occasion I went to her asking whether I could go to bed early with a cold. She looked me shrewdly in the eyes then peered behind an ear and said "No! young man! you are going down to the sanatorium. I suspect that you have measles." I had, and Oh! how bad I felt for forty-eight hours. Influenza in 1918 was nothing to it. Few doctors have measles late enough in life to remember how "whacked" the patient feels in the forty-eight hours that surround the onset of the rash. The one thing he wants is to be left alone. I remember this after forty years. Perhaps if doctors realised it they would not examine their patients so much. When I am called to a child with a running ear and I see a measles rash fully out, I look at it, leave it alone, and do not further examine it. You won't gain anything by minute examination at that time. You can do it without discomfort and more efficiently a few days later. I suspect it is the same with the chest.

* * *

The habit of looking things up in books of reference was another thing I learnt at school—from being school librarian. That post has meant a lot to me. You got no "colours" for it and when you came up to the hospital it gave you no status in your expanding world. Nor while you were still at school were you a hero of the Junior Common Room. You were just someone to be cursed by everyone who did not get the book he wanted after you had given up the spare time of Sunday morning to him. And yet I doubt if many who got into teams and were given colours, whose names adorn the school pavilion and whose photos fade upon its walls, got half so much in after life therefrom as I from being school librarian. It was not only that you had the first pick of a book—you seldom took it—or that you could take out as many more as you liked; you got an insight into books by the mere handling of them and into human nature by observing those chosen by other boys. You got into their thoughts when you found boys taking out week after week books of travel or on birds or a small boy going systematically through one of the classical novelists instead of asking every week for a Guy Boothby, who was the author of the day.

* * *

To be at the bottom of the lower sixth of one of our smaller public schools is to be in one of the finest

jobs in the world. I held it for two years. You can't hold it for ever; but the last six months have only been equalled once since. I had done my London matric and had two terms without a care in the world. I read in form and out of form—except when old Tom Steele took us in French—I read anything and everything—biography, poetry, novels, travel. Towards the end of the summer term my conscience began to prick me. Such a thing does happen when you see the end of four happy years approaching. And I made up my mind that when I got up to hospital, I would work like a nigger, or, as I understood they called it, I would "read hard." Over thirty years later, when I was attending a conference on medical education, I found that I had done just what we wanted all boys to do—pass an exam. and then stay on at school for a bit developing their own bent, in literature, in science, or in some mechanical achievement. I wish old Tom Steele had realised this at the time in those French hours.

* * *

Another grain that I brought from Bradfield came from James Watt when I was leaving and went to say good-bye to him. James Watt was a Scotsman, with a large nose, a heavy sandy moustache, and spectacles. His jaw shut with a snap and he was sarcastic. Boys do not like sarcasm. No children do. They do not understand it, and for some years I feared Jimmy for it. In my last year, however, I had got to like him and respect him. He had crammed me in science for the London matric, and he was the master in charge of the library. He never rammed a book down one's throat; when one was at a loose end for a choice he would casually pick one up and say "Just have a look at that and see if you like it." Next week you would enthuse and say "You never told me that was good, Sir!" and he would answer "No! but I am glad you think it is" and you would read approval in his eyes, through his gold-rimmed glasses. And when I went to say good-bye he said to me: "Let me give you two pieces of advice. As you can't draw, draw large. And don't give up your reading." And I stared at him because I had all those good intentions of "reading hard." He saw what I thought and said, "I don't mean that kind of reading. I mean your novels, your poetry, and your biography." And I never have. At least I did several times during these next ten years of study and exams. I used to think I was not "reading" enough and so must read less. But every time I did so I found my work the poorer, and had to go back to it. I wish I could pass James Watt's advice on to my own students; but they won't take it, they all "read" too much—especially text-books. It is partly their teachers' fault. It is nearly twenty years ago that one of my younger colleagues took a book from under my arm and said "Hullo! do you read modern literature?" and I answered "Yes! don't you?" "No!" he said, "not now. I find it takes all my time to keep up with the literature of my subject. I have no time for modern literature." "Ah!" said I, "It takes all my time to keep up with modern literature. I have no time for that of my subject." (At least I wish I had said this, but he had walked down the street before I had thought of it.) He has been very successful, and yet ——? Ten years previously he had come down from Cambridge, one of our most brilliant students and one of the most widely and wisely read. I sometimes think he would have been more use to our subsequent students had he continued to saturate himself in general literature instead of in that of his subject.

It is especially at examination time that we would wish to get them off their text-books. Sometimes one can do it by bringing to their notice books on the borderline of medicine, whereby they can still hope to get some tag that may be of use to them in an examination and yet break themselves of that addiction to text-books that they know is bad for them while they continue to sip or to gulp. Some of these books are classics like "The Surgeon's Log," others are becoming so, like "The Story of San Michele." Good ones are always coming out: Horder's "Health and a Day," Johnston Abraham's "99, Wimpole-street," Leipoldt's "The Bushveld Doctor," and Layton's "Behind the Night Bell" are all fairly recent; among the best of the older ones are "Plague and Pestilence in Literature and Art" by the late Sir Raymond Crawfurd, and "A Corner of Harley Street."

MEDICINE AND THE LAW

Refusal of Blood Test in Affiliation Proceedings

THE distinct though somewhat limited value of blood tests in paternity cases has now obtained sufficient publicity to encourage the putative father to demand a test. Where the evidence is otherwise sufficiently clear there is no legal reason why the court should be impressed by the mother's refusal. At Windsor police-court recently a girl declined to undergo the test and yet evidently did not thereby prejudice her case. There was corroboration of her claim; the respondent, a guardsman, had spoken and written of marrying her and he could not accuse her of having associated with any other man. During the proceedings in court the guardsman denied paternity and asked for a blood test. He also said that he would marry her if he could have a blood test and if the result showed that he could have been the father. This offer might have induced the girl to be tested, but she declined. Something was said of the test costing about £3, but it is not clear who was to pay for it. As is well known, this cost cannot be met from public funds.

Affiliation proceedings are neither exactly civil (like an action for damages for breach of promise of marriage or for seduction) nor criminal (though they are dealt with by magistrates in a police-court). In either civil or criminal cases, if anything could be proved by medical evidence and if no such evidence were tendered, the omission might be a proper matter for comment by counsel for the defendant. In an affiliation case the attitude of the bench is much influenced by the apparent character of the applicant. The defence may suggest that she is of bad character, profligate, or even a common prostitute. Where this allegation can be supported (though often it is mainly conveyed by cross-examination), the magistrates naturally feel obliged to receive her evidence with the greatest caution and to insist upon corroboration of the most convincing kind. In the controversial atmosphere of such a case the magistrates' minds may well be impressed by a refusal to submit to a blood test. On the other hand, where a girl of decent character makes out a reasonably strong claim, an evasive demand for a blood test will be discounted. The test, after all, is not a method of positive divination; it is merely a check which may operate to negative a claim in a limited proportion of cases.

PANEL AND CONTRACT PRACTICE

Public Medical Services

THE public medical service first made its appearance early in the present century. It was an attempt to provide a form of medical practice on a prepayment basis that should be free from the objectionable features of contract practice described over 35 years ago in THE LANCET articles "The Battle of the Clubs," and in the contract medical practice report of the British Medical Association. These publications had shown that though contract practice as then carried on was often bad for both doctor and patient, some form of contract practice was necessary to provide medical care for large sections of the community, and that contract practice could be conducted on lines satisfactory to the public and to the profession. The essential conditions were: (1) that the arrangements for providing medical care should be under medical control; (2) that the service should be open to all the practitioners of the neighbourhood; and (3) that there should be free choice of doctor. Public medical services fulfilling these conditions began to spring up in various parts of the country, but their development was suspended by the introduction of compulsory health insurance under which medical treatment was provided for the whole body of wage-earners, who form rather more than a third of the population. It was expected that medical benefit would later be extended to the dependants of the insured persons, but no steps have been taken in that direction, and as substitutes for that much-needed expansion of the national health insurance system various expedients have been adopted to provide medical care by voluntary insurance. Among these the public medical service is taking a place of increasing importance. The number of services now established is over 50 and the number of subscribers over 400,000. From the fourteenth annual report of the Essex public medical service, which has just been published, a good idea may be formed of the methods adopted by this kind of voluntary health insurance. At the end of 1937 the service had 32,239 subscribers (17,662 adults and 14,577 children), an increase of 1195 over the previous year, and the number of practitioners was 385, including 90 honorary members. The total income for the year was £24,546, and the expenditure £24,001, leaving a surplus of income over expenditure of £545. The total payments to doctors amounted to £18,397, the largest amount collected for any one practice being £1329.

The advantages of the public medical service, especially in comparison with private "doctor's clubs," are set out in a letter from a doctor who gave up his club on joining the service:—

"There can be no comparison between your scheme of organised 'service' and the older system of 'Doctor's Club.' Since becoming a member, I find my own membership has doubled itself, and the financial remuneration during my first year has exceeded all expectations. There is not the burden of collecting contributions, and hence no disputes can arise, which makes for more harmonious relations between doctor and patient."

An unsatisfactory feature of the report is the high cost of administering the service, the chief item of expenditure being collection expenses. Collectors' commission amounted to £3635 and their expenses to £94. The total cost of collecting the subscriptions was £3729, equivalent to 15·5 per cent. of the total expenditure, and other administrative expenses amounted to £1819, the total cost of administration being £5548, or 23·1 per cent. of the total annual cost of the service. The high cost of administration was doubtless unavoidable, but it is in striking contrast with the relatively low administrative expenses of the national health insurance system, which form 15 per cent. of the total annual expenditure. Indeed, the chief impression left by this interesting report is that there is much need to amend that system by the extension of medical benefit to the dependants of insured persons.

Special Limit on Practitioner's List

Many months ago an insurance committee dealt with a complaint that a practitioner, despite several messages, left a patient 20 hours before visiting him. The committee censured the practitioner, called upon him to refund the expense incurred in obtaining the services of another doctor, recommended the Minister to withhold £20 from his remuneration, and decided that a special limit of 2000 should be placed on the number of insured persons on his list. The practitioner's appeal, so far as it relates to the censure and to the refunding and withholding of money, has been dismissed, but the appeal tribunal's report says:—

"Regarding the committee's proposal to impose a special limit on Dr. A's list, we have some difficulty in understanding why they came to their decision. On this question we should like first to make some general comments.

"One of the fundamental principles of the National Health Insurance Scheme is that of the free choice of doctor by insured persons, and that freedom should not be limited beyond the general limit already imposed by regulation unless for very weighty reasons.

"In our view the provisions of Regulation 35 (2) (*a*) were designed to meet cases in which, for example, on account of the age or infirmity of the practitioner or of irremediable defects in the conditions of the practice, it is considered that the practitioner is rendered permanently incapable of giving adequate service to the maximum number of insured persons: it was not, we think, intended that the clause should be invoked by way of penalty for a breach of the doctor's terms of service. Mr. S. indeed told us that the proposal was not meant as a penalty in this case, and that the committee's ground for reducing the doctor's list was that he had inadequate assistance in his practice, that is, as we understand it, in regard particularly to his arrangements for the taking of messages. Dr. A's system in this respect is certainly not ideal and we think he would be well advised to consider amending it, but we do not think that the method proposed is a legitimate method to be employed in the first instance for inducing him to make the amendment, nor do we understand how it can be contended that the system, while inadequate for 2500 persons, is yet adequate for 2000. We have to record, therefore, that it has not been shown to our satisfaction that Dr. A is incapable of dealing satisfactorily with a list of 2500 insured persons."

This part of the appeal was allowed. But the insurance committee, while of course bound to accept the result, have returned to the charge. They say they were aware of the contention that imposition of a limit might mean some interference with free choice of doctor, but already that principle cannot be strictly observed, for in their area there is a general limit of 2500, whereas in an adjoining area it is 2000. The committee held that there is a principle more weighty even than that of free choice of doctor—namely, that there should be a good standard of service. Under regulation 35 (2) it is provided that,

after an investigation by the medical service sub-committee, the insurance committee may take action along one or more of four different lines, which appear to express different degrees in deterrence or discipline. The first of the four ways is that they may impose a special limit on the number of insured persons for whom a particular practitioner may undertake to provide treatment. Before the committee reached their decision it had already been suggested to them that this regulation was designed to meet cases in which, for example, the age or infirmity of a practitioner made him permanently incapable of giving adequate service to the normal maximum number of insured persons. The committee supposed, however, that if this was the design of the regulation, it would have been expressed within the terms of the regulation

CORRESPONDENCE

THE THEORETICAL MINIMUM COST OF DIET

To the Editor of THE LANCET

SIR,—In THE LANCET of May 28th, p. 1251, you reported my remarks on the cost of a specified "minimum" diet theoretically adequate. It would perhaps be well to explain how this diet was calculated and to analyse it. It was assumed that 3000 great calories and 37 grammes of first-class protein are essential per man per day—i.e., the low estimates of the Ministry of Health,[1] now largely abandoned in favour of the British Medical Association estimates. It is clear that this is a merely average figure and cannot be applied to individuals.[2]

The diet was chosen as follows:—

The day's ration of animal protein, 37 grammes, is taken as Australian Cheddar cheese, the cheapest way of buying animal protein. Of this cheese 5 oz. give the day's ration, and supply 607 calories. The deficit in calories (3000−607=2393) is made up from some cheap source. Bread was chosen as being practically the cheapest source of calories, and as iron and vitamin B_1 are low in cheese and white bread, brown bread was taken, of which 2·2 lb. give the 2393 calories. From cheese and brown bread probably only vitamin C is absent, though there may well be some doubt about vitamin D. To make certain of vitamin C some 4 oz. cabbage were added—less would be needed if it were eaten raw, but the assumption was that it is to be cooked.

The analysis as regards proteins, fats, &c., works out thus:—

—	Protein (g.).	Fat (g.).	Carbohydrate. (g.).	Calories.
5 oz. cheese	37·0	47·3	Nil.	607
2 lb. 3½ oz. bread (brown)	62·7	10·9	500	2393
4 oz. cabbage	1·5	0·2	10	48
Total	101·2	58·4	510	3048

This, although the fat is low, would be passed on the Ministry of Health standards of 1932.

The analysis for calcium, phosphorus, iron, and all vitamins except vitamin D shows such a theoretical diet to be beyond reproach.[3 4]

—	Calcium.	Phosphorus.	Iron.	A	B_1	C	D
	Mg.			I.U.*			
5 oz. cheese ..	1150	772	1·0	7000	—	—	—
2 lb. 3½ oz. bread (brown) ..	33	1970	26·8	—	750	—	—
4 oz. cabbage ..	50	27	0·5	990	91	666	—
Total ..	1233	2769	27·3	7990	841	666	?
Required ..	680	1320	15·0	5000	500	600	250

* I.U. = international units.

Perhaps to make it adequate 3·5 c.cm. of a good cod-liver oil is needed per day.

Theoretically such a diet is adequate according to present dietetic knowledge though we cannot be sure that all the iron in brown bread is available, or how much of the calcium would be rendered unavailable by the phytin of the brown bread.[5] There are however such surpluses of all the obvious protective materials except vitamin D that it is probable that the diet is theoretically adequate.

Of course the diet is an impossible one. The only reason for calculating it is to discover its cost. As originally quoted this was 8½*d.* per day or 4*s.* 9½*d.* per week. Possibly this was a little too high, because the cabbage was reckoned at 3*d.* per lb., bread at 2½*d.* per lb., and cheese at 8*d.* per lb. No allowance was made for cod-liver oil. Reducing the cost of cabbage to 1*d.* per lb. and adding ½*d.* per day for cod-liver oil we get a cost of 8*d.* per day, or 4*s.* 8*d.* per week.

Such a figure goes far to confirm Sir John Orr's estimate that 13½ million people in Great Britain spending 6*s.* or less per head per week are wrongly fed and underfed. A rock-bottom priced diet, impossibly monotonous, calculated at a low level of supposed adequacy, costs at least 4*s.* 8*d.* per week, a price above the means of 10 per cent. of our populace.—I am, Sir, yours faithfully,

V. H. MOTTRAM.

King's College of Household and Social Science (University of London), Campden Hill-road, W., June 25th.

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THE TRIAL LABOUR—AND AFTER

To the Editor of THE LANCET

SIR,—The leading article in your issue of June 18th raises an important issue. Trial labour is actually a confession of the continued failure to diagnose the presence of disproportion at full term in a given case.

Your summary of the history of obstetric practice indicates the changing opinion of previous years, and the attempts to find an answer to the problem. Before the advent of radiological pelvimetry, there was a growing feeling that the two factors of exact size of pelvis and of fœtal head could not be determined with sufficient accuracy to foretell the outcome of labour in doubtful cases, while the experience of clinical labour possessed by the older obstetricians taught them that prognosis could not be based only upon a knowledge of relative sizes in inches or centimetres.

The rejection of induction of labour, during the last few years, as a treatment for contracted pelvis in a primigravida is evidence of the general acceptance

of the view that the effect of a minor degree of contraction as a cause of difficulty is of less importance than the quality of the uterine "pains." Two women may have precisely the same minor degree of contracted pelvis and the same size of fœtal head. In one the "pains" are strong and regular, in the other they are feeble and irregular. The first patient is likely to have a normal labour, the second to show the clinical signs of contracted pelvis. In other words, much more attention has been given to the function of the uterus as the important factor in labour, and less to the mere mechanics of the pelvis and head. Recently the radiologist has offered us a comparatively accurate method of measuring the pelvic brim to within fractions of an inch, and I fear that some of the younger obstetricians, fascinated by the exactitude of measurement, are thinking again in terms of mechanics.

In so far as this may be true, I suggest, Sir, that the incursion of the radiologist into this aspect of obstetrics is a retrograde movement. While it may be of academic interest to know the exact size of the pelvic brim, it cannot form the only basis for prognosis. We must yet rely upon such observations as vaginal examination of the pelvis, relation of the head to the brim, and, not least, upon a knowledge of the woman herself. This last we call "clinical insight." It is the most valuable thing we can learn in obstetrics, and its importance is well described in the last paragraph of your leading article.

I am, Sir, yours faithfully,

London, W., June 25th. ALECK BOURNE.

TREATMENT OF SPLENIC ANÆMIA WITH IRON

To the Editor of THE LANCET

SIR,—In THE LANCET of June 11th Dr. Leonard Howells gave the comparative results of treating splenic anæmia by splenectomy and iron. In connexion with the latter treatment the following case may prove of interest.

A boy of 11 first attended Ancoats Hospital in September, 1930, giving a vague history of anæmia and lassitude for some time. He was of a pale lemon colour and had very marked enlargement of liver and spleen, both of which were hard and smooth. There was no glandular enlargement and no history of bleeding. His blood count showed 1,900,000 red cells, 4500 white cells (no abnormal cells), hæmoglobin 22 per cent., and colour-index 0·6. The Wassermann reaction was negative. There was no ascites. He was given a transfusion without much improvement and was sent to the convalescent home on liver diet and small doses of iron. He improved considerably and in November, 1930, his red cells were 3,000,000, white cells 12,000, Hb. 30 per cent. He attended the out-patients' clinic till May, 1931, and then did not reappear till February, 1935. By this time he was looking very ill again, very pale, and his liver and spleen were greatly enlarged (it was difficult to determine where the one began and the other ended). There was still no glandular enlargement and no ascites. He was mentally and physically very under-developed. He was seen by one of the surgeons who advised splenectomy, but this was refused by his father. In June, 1935, his red cell count was 2,750,000, white cells 3800, Hb. 28 per cent., C.I. 0·5. The van den Bergh reaction was normal. He was discharged from hospital and attended the out-patients' clinic, taking ferri ammon. cit. gr. x thrice daily.

In September, 1935, he was given much larger doses of iron (90 grains daily); as he improved so much on this the dosage was increased gradually till by January, 1936, he was taking 165 grains daily. In April his red cells were 5,440,000, white cells 9200, Hb. 102 per cent., and C.I. 1·0. By May he had improved so enormously that he could now run about and play with the other boys. His colour was excellent. He continued to take 150 grains of ferri ammon. cit. daily till July, 1937. The most surprising point about his clinical condition was that his spleen was so greatly reduced in size as to be only just palpable, while his liver had returned completely to normal limits. In May, 1937, his red cells were 4,530,000, white cells 5000, Hb. 76 per cent., C.I. 0·84.

He was sent for in the present month and his condition is still fairly good, though he has had to give up his job of furniture staining as he gets easily tired. His colour is not quite equal to what it was a year ago. His heart is normal and B.P. 120/80. His liver is not palpable but his spleen is enlarged two fingers-breadth below the costal margin. His red cells are 4,950,000, white cells 5000, Hb. 76 per cent., and C.I. 0·76.

The chief interest in this case lies in the fact that his condition did not improve materially until he was taking massive doses of iron, and in the fact that his liver and spleen diminished so greatly in size under treatment.—I am, Sir, yours faithfully,

ELSIE PORTER,
Cardiological Registrar, Ancoats Hospital, Manchester.

June 27th.

FIFTY YEARS' EXPERIENCE OF TYPHOID FEVER

To the Editor of THE LANCET

SIR,—The sanitation of European towns is now so perfect that the diseases of the typhoid group are only accidental; but here in Aleppo, the largest city of Syria, they are ever-present, often in epidemic form. Sometimes the paratyphoid and sometimes the Eberth type predominates. In the out-patient department they are found as a matter of course, and as a rule they have been treated elsewhere as malaria, influenza, or indeed any fever except typhoid. We see many other cases in their homes. These are generally of the adynamic type, being kept on a strict diet of boiled rice- or vegetable-water with milk and other fluids. Desperate cases are uncommon, probably because the indigenous population are constantly taking small doses of infection and acquire a certain degree of immunity, so that they succumb only to an extraordinarily large dose; when for instance their sewage finds its way into their well, or when they touch the drippings of the leaky barrels which parade the streets transporting the contents of the cesspools. To strangers coming into the country the smallest dose of infected matter may bring the most severe type of typhoid, and I always dread a case of typhoid in a European.

The mode of invasion is very varied. One type begins very suddenly with high fever, up to 40° C. in a few hours, with much general disturbance, vomiting, twitching, headache, and perspiration, which may last a whole week and then take the usual course. More rarely the onset may simulate acute yellow atrophy of the liver, with slight jaundice, diminution of liver dullness, air-hunger, and great restlessness. These cases run a very stormy course, upsetting the whole family as well as the doctor, and require subcutaneous glucose with insulin for several days.

In diagnosis we rely chiefly on the classical symptoms. We seldom do blood cultures (for most cases come late) but the Widal we do in every case. Children seldom give a positive Widal reaction, or if they do it is usually very weak and late. As

a rule the severer the disease and the stronger the person, the stronger is the Widal reaction.

In one case a middle-aged woman of lymphatic constitution was diagnosed clinically as typhoid, but up to the third week Widal tests were always negative. Later she developed cerebral symptoms. To relieve her we did a spinal puncture and the cerebro-spinal fluid gave a strongly positive Widal reaction and grew the *Bacillus typhosus*.

Some 35 years ago I had treated a boy of about 10 for typhoid; it was a severe attack with much intestinal hæmorrhage, but he made a good recovery. Several years ago he contracted typhus fever of which we have a few sporadic cases each year. At the end of the first week his Weil-Felix reaction was strongly positive and his Widal reaction was also positive up to a dilution of 1 : 30,000. I got the impression that typhus had mobilised his antityphoid bodies. Recently we did his Widal reaction again and it gave an agglutination of 1 : 50 for typhoid.

In the *treatment* of a disease that may last for months with various complications, the first objective should be to safeguard the patient's strength. Long before the war some American doctors announced that they had been giving their typhoid cases chops and anything else they fancied, and many practitioners were shocked. My experience of over 50 years on thousands of typhoid cases has convinced me that patients who are given an ample and varied diet of properly cooked food have a much lower mortality. Most of the cases treated in our out-patient department have had their normal diet, and recover splendidly; intestinal perforations, heart failure, decubitus abscesses, pulmonary complications, relapses, and intestinal hæmorrhages are comparatively rare. It seems natural to suppose that in typhoid the tissues are subject to wear and tear no less than in tuberculosis, and are as much in need of rich protein food for repair. We cannot expect half-starving cells to carry out efficient metabolism or immunisation. Rice- and vegetable-water have almost no caloric value and to supply enough calories by milk alone would require about three litres a day. What typhoid patient could endure such an ordeal week after week? On a milk diet the abdomen becomes distended and there is diarrhœa and colic; the patients lose their appetite, the mouth gets dry and septic, and the secretion of saliva and of all digestive juices is diminished. Patients become adynamic and lose their normal peristalsis so that the intestinal blood-supply is lessened and the ulcers become indolent and necrotic. Mastication of some appetising food stimulates the digestive functions and is essential for the hygiene of the mouth. For these reasons we enlarge the menu with puddings, soups, eggs, suitable vegetables, toast, butter, jams and fruits that do not contain seeds, hashed meat, and fish. When we cannot persuade or force food in we give nasal feeds with subcutaneous injections of glucose and insulin.

Medical treatment is still symptomatic. In the first week if necessary we give two doses of calomel, 2 grains each, at an interval of two hours, after which we do not give any purge; if the bowels do not move we use an enema every 24 or 36 hours. The long-continued fever is one of the constant symptoms that we have to combat. Formerly the cold bath or cold sheets were our principal remedy, but I am glad to say these measures are no longer in use, though I have found abdominal compresses dipped in water at room temperature very useful in children whose temperature is persistently over 40° C. Our present routine to check the fever is to give 2 grains of Pyramidon (amidopyrine) and if necessary an equal amount of caffeine every two or four hours until the temperature falls to about 38° C. Moderate fever had better continue. I have seen typhoid in elderly patients with very low fever (37·5°) or no fever at all, and they are as a rule fatal.

There was a time when we considered diarrhœa to be a constant symptom of typhoid, but since the change of diet we see more cases of constipation. When there is diarrhœa we stop milk altogether and give broth, tea, soups, mashed potatoes and, if it still persists, doses of salol and bismuth salicylate. For flatulence useful remedies are Tannalbin and lactate of sugar, the application of turpentine with olive oil to the abdomen with gentle massage, and the rectal tube. In severe hæmorrhage due either to hæmolysis or to ulceration of the bowel I have found blood-transfusion, repeated if necessary, to be specific.

Of the pulmonary complications lobar pneumonia is rare, but broncho-pneumonia is almost constant and is a serious complication. We try to prevent it by frequent changes of position, rubbing the back with camphor oil or a hard towel, and the use of a back rest. For many years now we have used as a prophylactic intramuscular injections of menthol and eucalyptol, consisting of menthol 10 parts, eucalyptol 20 parts, olive oil 50 parts, sterilised for 40 min. in a water bath; the dose of this is 1 c.cm. for children and 2 c.cm. for adults. When pneumonia is established we continue the same injection with occasional rests. In protracted cases I have seen much benefit from Creosotal in the form of an emulsion, and from the injection of camphor and Transpulmin or quinine.

As a rule the heart takes care of itself up to the end of the second week. When the pulse begins to get small and soft I use camphor and Cardiazol injections, morning and evening, and do not use digitalis as a routine. One can do much by improving the general condition by stimulant nourishment rather than attempting to aid the heart direct: A dicrotic pulse need not alarm us; it soon disappears and is characteristic of typhoid.

The majority of patients have albuminuria and often cystitis with bacteriuria. For this we modify the food and give infusion of buchu with sodium bicarbonate. It is the nervous system, central and peripheral, that the typhotoxin attacks more than any other infectious disease. All forms of nervous affection are seen from simple somnolence to coma and from muttering to violent delirium, subsultus tendinum, meningitis, and disorders of the spinal nerves. Their treatment must be conducted on neurological lines, cerebral tension being relieved by repeated spinal punctures and sleeplessness requiring Luminal, Promonal, or bromides. The complications of typhoid are very numerous and the ultimate outlook must depend on the peculiar susceptibility of the individual, his "punctum minimum resistans," and the virulence of the bacteria.

I am, Sir, yours faithfully,

Aleppo, Syria, June 15th. A. A. ALTOUNYAN.

HEART-HOMES FOR RHEUMATIC CHILDREN

To the Editor of THE LANCET

SIR,—Many of us will feel real sympathy with the author of last month's Grains and Scruples, in so far as he successfully points out the danger to the community of concentrating on health rather than on the real adjuncts of life. Only the other day I protested to a lady who had talked for a long and (to me) arduous time about matters of health and disease, saying that it was a very boring subject for a layman to be so interested in: her reply was,

"Well! you have music for a hobby: why should not I have this?"

A London Practitioner wisely omits children from his list of patients who would actually suffer from a health campaign, so that I do not see why, later in his article, he selects the rheumatic diseases as an example of a condition where prevention is superfluous. Captain MacWhirr at least said, on perceiving a fall in the barometer, "There's some dirty weather knocking about," and it is no very great act of the imagination to say, when you have diagnosed rheumatism in a child, "There's some dirty carditis knocking about"; and the wise will prefer allowing a child a sufficiency of rest in a heart-home to give him a chance of avoiding a very fatal infection, to risking the Typhoon of a pan-carditis, or, what is almost as bad, a progressive smouldering infection which will in time cut short his active life.

I am, Sir, yours faithfully,

Broadstairs, June 27th. MARTIN O. RAVEN.

PLUS ÇA CHANGE

To the Editor of THE LANCET

SIR,—"Forty years on, growing older and older." Well, it is nearer fifty years since I first walked a hospital. Your Grains and Scruples have amused me and I would add a milligramme to the words of wisdom of A London Practitioner.

Mine has been a lucky era. After the apathy of last century medicine has burst into full blossom, and the buds are charming. I have seen the show from the front line to the base, for I attended the first class of bacteriology after I was qualified, and since then X rays, biochemistry, the sphygmomanometer, the electrocardiograph, &c., have added their quota to the general pool. How much have they helped us?

We have slogans to-day including his blessed word *Research*. The other day a girl told me, tilting her pretty nose-tip into the air: "I won't be a G.P. I am going to research." I was curious and investigated. She was cutting sections of different parts of the skin, and counting the number of hairs to the square inch. No! My apologies. She was calculating the average number of hair follicles par décimètres carrés.

I saw a woman this afternoon. What was the matter with her? An old patient came to see me. Was he improving? Could his treatment be altered with advantage? Was I not conducting a research?

Team-work. Of course. We all work with other fellows. Can my patient's husband help her to get better? Is there any woman in the connexion who can be of use to her? Has Burroughs Wellcome and Co. any suggestions? Must I bring in the public authority? Man is not able to live alone.

The *Public Health Authority*. It is needed to maintain the "public health," to combat disease on the grand scale, to remove noxious stuffs, to ensure good food, to provide good houses. Yes; but do we need it to make us brush our teeth? No! An authority cannot help an individual. Surely the family G.P., who knows the family and their surroundings and the whole circumstances of their daily life, is more likely to be a help. Will any woman allow the choice of her doctor to be decided by anyone save herself!

Files—The Files—Office Files. Oblige me by referring to the Files. . . .

Wonderful little, when all is said,
Wonderful little our Fathers knew.
Half their remedies cured you dead—
Just as, my father, our *hormones* do.

"All sorts and conditions of men" says the Prayer Book. There's the rub. You will not meet them in the laboratories, or the out-patient departments, of the great cities. We must go back to the land.

I have *my* doctor now. He tells me that he was educated in the country by the Duchess and a roadman's wife—how to treat the sick. He cannot do a Wassermann test or estimate a complement fixation; but he knows who are the guardians of "The Citadel," he can throw a dainty fly, his golf handicap is 5; and he can make tired men rise up and march again with his penny whistle.

The laboratories be blowed. Give me the penny whistle.

I have the Honour to be Sir,
Your Humble and Obedient Servant,

June 25th. VICTORIAN

CONTROL OF INFECTION IN CHILDREN'S WARDS

To the Editor of THE LANCET

SIR,—We thank Dr. Ronaldson for correcting an important error which we had overlooked. The statement that "clinical diagnosis is not possible until *the end of* the . . . prodromal stage" is clearly wrong, and the words italicised should be omitted.

We endorse his protest against carelessness in the receiving-room and his insistence on the importance of early diagnosis. Of greater importance in general hospitals is the undiagnosable case of febrile catarrh. It was for this reason that the possible absence of Koplik's spots in measles was stressed and not their frequent occurrence. So often infection is spread through waiting until a case is diagnosable that we attempted to formulate a technique which would lead to immediate isolation at an earlier stage.

Our reference to repeated ward infection during epidemics was to those children inevitably admitted to general hospitals during the *incubation* period.

We are, Sir, yours faithfully,

R. H. DOBBS,
R. KEMPTHORNE.

University College Hospital, London, W.C., June 28th.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED JUNE 18TH, 1938

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 0; scarlet fever, 1746; diphtheria, 889; enteric fever, 15 (30 "expected"); pneumonia (primary or influenzal), 787; puerperal pyrexia, 176; cerebro-spinal fever, 22; acute poliomyelitis, 0; encephalitis lethargica, 3; dysentery, 37; ophthalmia neonatorum, 106. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on June 24th was 3698, which included: Scarlet fever, 761; diphtheria, 940 (carriers 47); measles, 860; whooping-cough, 263; puerperal fever, 8 mothers (plus 4 babies); encephalitis lethargica, 280; poliomyelitis, 1. At St. Margaret's Hospital there were 22 babies (plus 8 mothers) with ophthalmia neonatorum.

Deaths.—In 126 great towns, including London, there was no death from small-pox or enteric fever, 14 (5) from measles, 5 (0) from scarlet fever, 15 (3) from whooping-cough, 29 (3) from diphtheria, 48 (20) from diarrhœa and enteritis under two years, and 21 (2) from influenza. The figures in parentheses are those for London itself.

Deaths from diarrhœa and enteritis under two years occurred in seventeen great towns, Birmingham reporting 4, Sunderland 3, and no other town more than 2. There were 3 fatal cases of diphtheria at South Shields. Hull reported 3 deaths from whooping-cough.

The number of stillbirths notified during the week was 297 (corresponding to a rate of 37 per 1000 total births), including 55 in London.

PUBLIC HEALTH

Dairy Research

THE output of milk and dairy produce in 1935–36 from the farms of England and Wales was valued at between 50 and 60 million pounds. Much of this production is governed by rule-of-thumb methods evolved from experience and yielding, it must be confessed, excellent results. But everyone nowadays realises the vast improvements which a scientific study of dairying might effect. In spite of the considerable amount of experimental work done, our knowledge is still very inadequate in many directions and particularly on the nutritive side. These matters do not solely concern those engaged on the business side; since they affect the quality, price, and safety of the milk on the market they are of interest to everyone.

A report[1] issued by the Dairying and Animal Products Committee reviewing dairy research in progress in Great Britain is worth careful attention. It discusses the progress and achievements in seven laboratories, but in greatest detail the work being done at the two national dairy research institutes, one at Shinfield (near Reading) and the other at Kirkhill in Scotland. The researches in hand cover a wide field. They include investigations on the food requirements of dairy cows; the nutritive value of milk and milk products; the chemistry of milk; diseases of cattle, such as tuberculosis, contagious bovine abortion, and mastitis; bacteriological problems associated with milk grading, milk counts, and so forth; technical problems of milk, cream, and cheese production; the pasteurisation of milk; and the cellular content of milk. While work of high standard and much value has been and is being done, little finality of knowledge or opinion has been reached on any of these subjects, for in nearly all further research is needed. Of special value, from the medical standpoint, are the various experimental researches dealing with the relative nutritive value of new and pasteurised milk.

The work done at the National Dairy Research Institute, near Reading, is discussed more fully in the annual report of that institute for 1937. In addition to research, a great volume of routine work is summarised and some account is given of the useful and much appreciated advisory activities of the various branches of the Institute. The report on dairy research contains a discussion on the work of the Dairy Bacteriological Service. There are ten dairy bacteriologists, working at different centres, under the Department for Agriculture. The scheme began in 1924–25 with three appointments on a temporary basis, and two years later was extended to seven other centres. The cost was mainly paid by grants from the Development Commission's Funds and partly from fees earned. The service does mainly advisory work and routine testing, with a little research. It is clear from the report that there is no sharp division between its functions and those carried out by the various county laboratories. Some of the latter are well-equipped laboratories and do, or wish to do, most of this work; in other counties the authorities are glad to avail themselves of this service. There is some overlapping and it is time that the position and functions of the dairy bacteriologists were defined in relation to those of the public health and dairying staffs of local authorities. This report in general favours the view that their continuation is required, but it is recognised that a contrary view may be held by county authorities which themselves provide an efficient service. This problem of the personnel to do the bacteriological work is really but a part of a larger issue which is not here discussed. There is an urgent need for more uniformity of practice both in the collection of samples and in the accepted standards of bacteriological quality for ordinary milk, apart from those types of milk which are specially designated. Even for the latter well-prescribed standards much depends on the time of collection in relation to the time of milking. Most standards relate to "any time before delivery to the consumer," and if the practice in one area is to collect at the place of production and in another just before delivery to the consumer, it is useless to compare findings in the two areas. This is even more useless for ungraded milk for which there are no standards. Yet such comparisons are constantly being attempted or figures are issued stating that such and such a percentage of ungraded milk was "up to accredited standard." A material proportion of the samples cannot be said to come up to any such standard, since they were collected at the place of production and not under the conditions contemplated when the standard was framed. With these varying conditions it is nearly useless to compare milk produced in different areas. The whole question needs detailed consideration, but at present is not included in any of the subjects under investigation.

[1] Dairy Research. A.R.C. Report Series No. 3. 1938. H.M. Stationery Office. 2s.

After-histories of Tuberculous Patients

Each year since 1926 a survey has been made of the condition of tuberculous patients five years after their discharge from the residential institutions of the London County Council. The pulmonary cases are divided into two classes according to whether tubercle bacilli have been demonstrated in their sputum. In Class A bacilli have never been found and in Class B they have been found at some time. Class B is further subdivided into three groups according to severity: B1 are early cases, B2 moderately advanced, and B3 advanced cases. Excluding those patients in whom the diagnosis of tuberculosis was not confirmed, and those who were under treatment for less than a month or who could not be traced, the number discharged in 1932 and investigated this year was 3374, which included 303 surgical cases. Taking males and females together, 480 were in Class A, 169 in Group B1, 1803 in Group B2, and 619 in Group B3. The proportion of males still alive after five years was: in Class A 76·3 per cent., in Group B1 81·7 per cent., in Group B2 39·4 per cent., and in Group B3 8·6 per cent. The results in females were much the same. Of the non-pulmonary cases, 67·8 per cent. of males and 81·2 per cent. of females were still alive. The figures for pulmonary cases have improved considerably in the last twelve years, especially in the more advanced groups, and the total alive after five years has risen from 36·1 to 42·1 per cent. In non-pulmonary cases there has been little change.

The figures are presented to the London County Council in a report from its hospitals and medical services committee.

ST. JOHN'S HOSPITAL DERMATOLOGICAL SOCIETY.—At a meeting of this society on June 22nd an illuminated address and a travelling clock were presented to Dr. W. K. Sibley on his retirement from the treasurership.

OBITUARY

JOHN VICTOR WALTON RUTHERFORD, M.B. Edin.

IN his 82nd year, Colonel J. V. W. Rutherford died on June 18th at Newcastle-on-Tyne, where most of his work had been done. Educated at Edinburgh, where he was well known as a rugby player, he qualified in 1887, became house surgeon at the Edinburgh Royal Infirmary, and worked in Berlin and Paris. With his younger brother, the late Dr. Vickerman Rutherford, he then started in general practice in Newcastle, to carry on the work of their father. John Rutherford senior had been not only a successful practitioner but an educationist, and was the founder of the College at Newcastle that still flourishes under his name.

From general practice the elder son was attracted to surgery, and when opportunity arose at the Newcastle Infirmary he sought election. In 1897 he became assistant surgeon and for some years he worked in that capacity with Rutherford Morison. In 1906 he was appointed to the full staff with charge of wards, and he continued in that office until 1917 when he retired on reaching the age-limit and was made an honorary consulting surgeon. Besides the Royal Victoria Infirmary he was on the staff of the Hospital for Diseases of the Skin, and of the Throat and Ear Hospital at Newcastle, acting also as lecturer in clinical surgery at the College of Medicine. A former associate recalls his knowledge of human nature, his shrewdness, and his flair for diagnosis. "He had good hands and was a very nice operator, but he was not attracted to the routine of hospital work or of teaching. He did, however, encourage the junior members of his firm, gave them ample opportunities, and was always interested in their exploits." Comparative affluence enabled him to enjoy those country pursuits at which he was an adept and also allowed him to take a very active interest in the old volunteers and in the Territorial Army. At the outbreak of the late war he was assistant director of medical services for the Northumbrian territorial division and served in France in that capacity. After the war he was engaged in military duty until his retirement to Parame in the south of France some years later.

"Colonel John," as he was called, was deeply attached to his own homeland and to the Newcastle-on-Tyne Infirmary, and he returned there when his health began to fail during the last year or two. He was buried in Benwell churchyard, not far from his old home, on June 21st, the funeral being attended by some of his old residents and colleagues.

He was twice married and is survived by his wife and a young son.

PARLIAMENTARY INTELLIGENCE

THE ASSESSMENT OF NUTRITION

ON June 20th, when the House of Commons went into committee of supply on the Board of Education vote, Mr. KENNETH LINDSAY, Parliamentary Secretary to the Board, said that the estimates for 1938 were, with the single exception of 1921, the largest ever submitted to Parliament. They amounted to a little over £51,000,000, an increase of £1,500,000 over 1937. A large part of the increase was due to the establishment of the National Fitness Council. An estimated increase of £500,000 under the heading of special services included £150,000 on the provision of meals and £350,000 on school medical services. (Viscountess ASTOR: It ought to be the other way round.) There had naturally been some criticism, for example in regard to the clinical method recommended for the assessment of the nutrition of school-children. There were admittedly inconsistencies between the returns for similar areas, but the method produced a valuable picture for the country as a whole. It was not easy when dealing with 5,000,000 children to arrive at a proper method of assessment of malnutrition unless they were prepared to give school meals to all on a non-contributory basis, and if they did that they would have to be prepared for the appropriate expenditure. The Advisory Committee on Nutrition stated that the Board's present clinical method based on the opinion of an experienced physician was the most promising. If applied with skill and understanding it discovered the great majority of children whose nutrition was defective. The returns for 1937 showed an increase in the percentage of children with excellent nutrition, and a slight fall from 0·7 per cent. to 0·6 per cent. in the proportion with bad nutrition. The figures for 1936–37 showed that the number of children receiving free solid meals or milk had increased from 479,000 to 535,000 as compared with the previous year and the number of free meals from 86,500,000 to 100,000,000. It was practically certain that these figures had again increased in 1937–38.—Mr. LEES-SMITH said that one of the large social developments in the last five years had been the discovery by the medical profession of the doctrine of nutrition. They were making it clear that the most important element in the health of a child, and in the subsequent health of the man, was the actual physical intake of the right kind of food. He believed that the Board's method of clinical assessment would have to be abandoned, because it was completely contrary to modern scientific methods. Sir Frederick Gowland Hopkins had stated plainly that children might suffer from a high degree of malnutrition before the outward signs became observable by a teacher or a school medical officer. The Labour Party had been for sometime recommending an alternative method which now had the support of the medical profession. In this they calculated the actual quantity of calories, phosphates, proteins, fats, and so on which were required for the proper development of a child according to its age. They then calculated from the family budget which the Ministry of Labour was preparing the cost of the food containing this quantity, and finally they calculated what was the lowest income on which families could afford to buy those foods. In that way they could tell broadly the minimum income below which sufficient food to prevent malnutrition could not be provided. It was now recommended that all children should be fed who came from families below that level of income, because if some of them were not under-nourished that was only because their mothers were living on bread and margarine and tea. What was most striking was the extraordinary disparity in the results arrived at by the Board's methods and by those suggested by medical officers who advocated better nutrition. By the clinical assessment method the Board found for 1936 that 10·5 per cent. of children were slightly subnormal and only 0·7 per cent. were bad. The British Medical Association said that 30 per cent. of the children came from families where they were bound to be suffering from malnutrition, and according to Sir John Orr 50 per cent. came from such families. The explanation of this discrepancy probably was that the school medical officer had to choose which of the children were abnormal. His standard was the average physique of the children in the schools in the

area. He took the average as the normal, and if that was done it could be worked out in advance that about 10 per cent. would be slightly below the normal and 1 in 100 very much below. That was all that that method led to. What the British Medical Association and Sir John Orr were really showing was that the average child in these schools was undernourished. That was the great controversy on which the lives and the health of millions of children would turn, and in that controversy the verdict was going against the Board of Education.

NOTES ON CURRENT TOPICS

Family Allowances and Child Nutrition

Speaking on June 24th in the House of Commons on the vote for the Ministry of Labour, Mr. AMERY said that the Unemployment Assistance Board had imposed upon it by Parliament two duties. One was to provide adequately on a minimum scale for family needs, and the other was to see that its administration did not create an incentive to people to leave work and come on the Board. Were we to decide that our wage system for employed men and our payments to those out of work should take some account of the minimum needs of a family, or that they should be governed entirely by the value of the work to the individual employer? The present uncorrected flat-rate-of-wage system meant wherever there were large families of children that the coming of every additional child was a hardship not only to the parents but to the rest of the family and to itself. The burden of poverty fell hardest on those children who came into existence in large families. The result was undoubtedly that a very large proportion of our children were to-day underfed. The medical officer of a large industrial concern had said it was astonishing how the only child of a family stood out as physically superior to the adolescents in a family of more than two or three children. "Working-class parents," he had said, "have come to the unhappy pitch where they can have only one or two children if they are to afford an adequate diet for them. That is a major national catastrophe." Apart from conscious deliberate restriction of families this meant that those who would otherwise have small families had the best chance and the leadership of our country more and more was taken over by infertile stocks that could not transmit such qualities of responsibility, citizenship, and leadership as they had acquired. The methods already in existence in other forms of insurance could no doubt be adapted to this case. He had seen figures worked out in a survey of a typical industrial factory in the north. The calculation was that for every 1000 male workers employed it would cost £120 a week to provide 5*s*. a week for every child. It would cost £90 a week to provide 5*s*. a week for every child after the first; £43 a week to provide 5*s*. a week for every child after the second; and only £15 a week to provide 5*s*. a week for every child after the third. In other words, the greatest hardship, which was that of the family of over three children, could be met by a twelfth of the expenditure involved in providing allowances for all children.—Dr. HADEN GUEST said that it was clear from the Unemployment Assistance Board's report that there were well over 500,000 children in dependent households where the amount of income being received in assistance was inadequate to support health. There was something that the Minister of Labour could do immediately. He could call for a report on the physical condition of all children of families on unemployment assistance. A medical report on their condition should be rendered at least once a quarter as long as a family was receiving that assistance. He (Dr. Guest) was convinced that it would then be impossible for the Minister to resist the physical argument of the urgent necessity of increasing the allowances to an amount adequate to provide these children with proper food.—Mr. E. BROWN, Minister of Labour, said that Mr. Amery and others could be assured that he (Mr. Brown) had carefully studied the question of family allowances in the light of the reports of Sir William Beveridge, the Unemployment Assistance Board, and the Pilgrim Trust, and a host of other publications. The trade union opposition in this matter was not because they were reactionary. One of the instincts on the Continent was the desire to keep the general wage level low, and that was an instinct to which the House of Commons must pay no heed whatever.

Experiments on Living Animals

In the House of Commons on June 28th on the motion of Earl WINTERTON, Chancellor of the Duchy of Lancaster, an address was agreed to for a Return of Licences granted under the Act 39 and 40 Vict., c. 77, showing the number of experiments performed under the Act during 1937, and the registered places at which such experiments might be performed (in continuance of Parliamentary Paper, No. 135, of 1937).

In the House of Lords on June 23rd the Royal Assent was given to the Prevention and Treatment of Blindness (Scotland) Act and the Infanticide Act.

In the House of Lords on June 27th the Mental Deficiency Bill (which has passed through the House of Commons) was read a second time.

QUESTION TIME

WEDNESDAY, JUNE 22ND

Tropical Diseases in British Colonies

Mr. DAVID ADAMS asked the Secretary of State for the Colonies whether he was aware that in the southern United States full-time malaria units, consisting of a physician, an engineer, and an entomologist, were now being added to the staffs of State health departments; and whether parallel steps were being taken in British colonies in the control of tropical diseases.—Mr. MALCOLM MACDONALD replied: Yes, Sir. Similar steps have for some years past been taken in most British colonies. The need for coördinating medical, engineering, and entomological advice is fully appreciated.

Children Injured on Electrical Railway Lines

Mr. WALTER GREEN asked the Minister of Transport the number of instances in which coroners' juries had adversely criticised the Southern Railway during the last twelve months in respect of deaths of children to which inadequate protection of electrified lines had contributed.—Mr. BURGIN replied: During the twelve months ended May 31st last eight children were fatally injured through coming into contact with the live rail on the Southern Railway. In two cases the coroner's jury commented adversely on the fencing provided.

Woman's Death from Small-pox

Mr. LEACH asked the Minister of Health if his attention had been drawn to the circumstances attending the death from small-pox of Miss Nolan at Gravesend on May 20th; if he was aware that her father died on April 28th with considerable signs of small-pox but was medically certified as dying from influenza; and if he would cause an inquiry to be held.—Mr. ELLIOT replied: My attention has been drawn to the death from small-pox of Miss Nolan and of the death of Mr. Nolan which was certified as due to heart failure following influenza. Inquiries have been made by a medical officer of my department and I am advised that the symptoms and physical signs in the case of Mr. Nolan were not such as to enable a diagnosis of small-pox to be made.—Mr. LEACH: Does the Minister know that very few doctors in this country have ever seen a case of small-pox, and that they are not therefore very competent to diagnose one?—Mr. ELLIOT: That is a great tribute to the improvement in the public health.

Postponement of New Milk Legislation

Mr. ALEXANDER asked the Minister of Agriculture whether he was in a position to make a statement with regard to forthcoming milk legislation, having regard to the fact that the provisions of the existing temporary

measures expired on Sept. 30th next.—Mr. W. S. MORRISON replied: I regret that owing to the pressure on Parliamentary time it will not now be possible for legislation to give effect to the Government's proposals contained in the White Paper on Milk Policy issued in July, 1937, to be introduced and considered this session. The Government hopes, however, to introduce such legislation early next session, and, as an interim measure, proposes to ask Parliament to pass before the summer recess a Bill to extend the chief provisions of the Milk Acts, 1934 and 1937, for a further twelve months until Sept. 30th, 1939, and, as proposed in paragraph 8 of the White Paper, to release the Milk Marketing Boards from liability accruing after Sept. 30th last to repay to the Exchequer the advances made under the Milk Acts in respect of manufacturing milk. An extension of Section 11 of the 1934 Act will enable Exchequer contributions to be made towards the cost of the schemes referred to in paragraphs 20 and 21 of the White Paper—namely, cheap milk for school-children and for expectant mothers, and children under school age, and in order to facilitate the development of those schemes the Government proposes to ask Parliament to provide an additional £750,000, instead of the £500,000 hitherto made available annually.

Contaminated Milk Containers

Brigadier-General CLIFTON BROWN asked the Minister of Health whether his attention had been directed to the recent report of the Agricultural Research Council complaining that milk churns are frequently returned by the dealer to the producer unsterilised and grossly contaminated by bacteria; and whether he would consider an official definition of cleanliness and make this practice a fineable offence.—Mr. ELLIOT replied: The Milk and Dairies Order, 1926, places a duty on the dealer to cleanse churns thoroughly before returning them to the producer, and on the producer to cleanse and scald with boiling water or steam all vessels used by him for containing milk. Failure to carry out these duties is a fineable offence. I am not at present satisfied that an attempt at closer definition would assist in the administration of the law.

Analgesia

Dr. SUMMERSKILL asked the Minister of Health (1) how many local authorities had arranged for the midwives in their employ to have special instruction in order that they might unaided give their patients analgesia, and (2) how many local authorities had availed themselves of the powers conferred upon them to provide the necessary apparatus for their midwives in order that analgesia might be available for women at their confinements.—Mr. ELLIOT replied: I propose to include a request for this information in the annual return which I shall be receiving from local authorities for this year.

Asylum Officers' Superannuation

Captain ELLISTON asked the Minister of Health whether, as under the Asylum Officers' Superannuation Act, 1909, an officer dismissed for misconduct might, at the discretion of the visiting committee, be entitled to a refund of contributions, whereas no refund might be sanctioned in the case of an officer who voluntarily resigned, he proposed to correct such anomaly by amending legislation.—Mr. ELLIOT replied: The superannuation scheme applicable to asylum officers is a very liberal one, the benefits being high and the contributions paid by them low, and as at present advised I see no reason to propose the suggested amendment.

Registrar-General's Vital Statistics

Mr. MARKHAM asked the Minister of Health whether any steps were being taken to speed up the publications of annual health reports and the Registrar-General's Statistical Review; and when the reports for 1937 would be available.—Mr. ELLIOT replied: As regards the annual reports of medical officers of health, I would refer to a reply which I gave on the 17th instant. As regards the Registrar-General's Statistical Review, steps are being taken to expedite publication as much as possible; and it is expected that "Tables: Part I" will be published in October next and "Tables: Part II" before the end of the year.

Workmen's Compensation

Mr. ELLIS SMITH asked the Prime Minister if he would set up a Royal Commission to investigate the Workmen's Compensation Acts and the effect of accidents and industrial diseases on the lives of the people.—Mr. CHAMBERLAIN replied: As the House will recollect, proposals for alterations in the present system—some of them of a far-reaching character—have been debated on several occasions during the last few years, and while there has been great divergence of opinion on the merits of the particular proposals, it has been generally recognised that there is a strong case for review of various provisions of the existing Acts in the light of modern ideas and conditions. The Government have come to the conclusion, having regard to the magnitude and complexity of the questions at issue, that it would be impossible to frame any satisfactory legislation without an up-to-date inquiry of a formal and comprehensive character. The Government have accordingly decided to recommend the appointment of a Royal Commission with wide terms of reference which will enable it to inquire generally into the working of the present system and give authoritative advice as to any changes which may be desirable.

Child Labour in Kenya

Mr. RILEY asked the Secretary of State for the Colonies if, where children of 10 years of age and upwards were employed under contract in Kenya, the district officer must in all cases certify such contracts; whether before such contracts were entered into the medical officer of the district must examine the child and certify its physical and mental fitness; and whether the employers of such children were under legal obligation to keep a register of such children where they were employed on the surface of mines or on plantations.—Mr. MALCOLM MACDONALD replied: The answer to the first part of the question is in the affirmative. As regards the second part, it is prescribed that no person shall employ a juvenile in any class of labour for which in the opinion of a Government medical officer he is physically unsuitable. As regards the third part it is prescribed in the Employment of Women, Young Persons, and Children Ordinance, 1933, that the employer shall keep a register of all young persons employed in any industrial undertaking (which includes a mine), the minimum ages for which in Kenya vary from 12 to 16 years according to the nature of the employment. There is no corresponding provision in regard to the employment of children on plantations except where the employment is of an industrial character.—Mr. DAVID ADAMS: What is the nature of the employment for children at ten years of age?—Mr. MACDONALD: It is really employment in the plantations, principally picking foreign bodies off the tea trees. It is all employment of a light kind.—Dr. EDITH SUMMERSKILL: What is the maximum number of hours that children of 12 can spend underground in the mines?—Mr. MACDONALD: I think I am right in saying that the employment of children of 12 underground is entirely prohibited.

MONDAY, JUNE 27TH

Refugee Doctors and Dentists

Mr. PARKER asked the Home Secretary whether refugees from Germany and Austria were allowed to practise as doctors or dentists in this country if suitably qualified; and whether the Government, in dealing with this question, consulted the principal professional organisations concerned.—Mr. GEOFFREY LLOYD (Under-Secretary, Home Office) replied: Permission has been given in a limited number of cases to refugee doctors and dentists from Germany to practise their profession after admission to the British medical and dental registers. The question of admitting a further number of refugee doctors and dentists from Austria is now under consideration, and before reaching a decision my right hon. friend proposes to consult representatives of the medical and dental professions in this country.

Gas Poisoning and Workmen's Compensation

Mr. WALKER asked the Home Secretary if his attention had been called to the remarks of the coroner at an inquest

held at Port Talbot, on the 17th inst., into the death of a gas-producer man employed at the Port Talbot steel works, to the effect that the circumstances surrounding the employment of gas-producer men should be brought to the notice of the Home Office, as there was sufficient evidence to justify the conclusion that death was due to gas poisoning arising out of the atmospheric conditions under which the man was employed; and if he would institute an inquiry into the conditions of employment of gas-producer men in the steel trade, with a view to bringing this class of employment within the jurisdiction of the industrial diseases schedule of the Workmen's Compensation Act.—Mr. GEOFFREY LLOYD replied: I have seen press reports of the inquest in this case, but they contain no statement attributed to the coroner that there was sufficient evidence to justify the conclusion that death was due to gas poisoning arising out of the atmospheric conditions under which the man was employed. The verdict was heart failure, due to flabby heart, accelerated by acute bronchitis and emphysema. As regards the last part of the question, I understand that gassing by carbon monoxide is already compensated as an accident, and on this and other grounds the Departmental Committee on compensation for industrial diseases which specially investigated the question of scheduling carbon monoxide poisoning in 1933, did not feel justified in recommending that it should be scheduled.

TUESDAY, JUNE 28TH

Medical Officers at Recruiting Depôts

Mr. DENVILLE asked the Secretary of State for War if he had considered the complaints of medical officers attached to recruiting depôts as to the insufficiency of their remuneration and of the insecurity of their engagement; and what steps he was taking to meet them.—Mr. HORE-BELISHA replied: No complaints have been received.

MEDICAL NEWS

University of Oxford

On June 23rd the following degrees were conferred:—

D.M.—F. Bicknell and D. A. Robertson.

B.M., B.Ch.—R. G. Blackledge, F. G. Ethiraj, and S. R. Gloyne.

University of Cambridge

At recent examinations the following candidates were successful:—

THIRD EXAMINATION FOR M.B., B.CHIR.

Part I, Surgery, Midwifery, and Gynæcology.—H. St. C. C. Addis, H. W. Adeney, R. S. Alexander, J. T. H. Butt, D. L. Caldwell, P. L. Candler, R. I. G. Coupland, A. R. P. Ellis, J. Evans, D. Foskett, G. A. Fowler, D. Garcés, W. Goulstone, E. F. Graham Kerr, S. G. Hamilton, J. P. Henry, I. T. Hinde, C. H. Hoskyn, R. D. S. Jack, G. B. Leyton, M. Lloyd, V. L. Lutwyche, A. G. McPherson, J. A. R. Miles, P. L. Mollison, N. E. Monteuuis, M. E. Moore, A. W. N. Oatway, J. S. Pratt, L. M. Reid, D. L. Ridout, C. J. Rooke, C. C. Shaw, I. F. Smith, E. W. Somerville, T. L. Stoate, N. Vere-Hodge, J. D. Wade, D. O. Walker, W. W. Wiggins-Davies, J. M. Wilkin, B. J. O. Winfield, M. C. Woodhouse, B. M. Wright, A. Young, and J. D. Younghusband.

Part II, Physic, Pathology, and Pharmacology.—H. W. Adeney, E. W. O. Adkins, R. S. Alexander, C. H. Bartlett, A. H. Baynes, K. G. Bergin, J. R. Bignall, R. D. D. Birdwood, A. W. Bone, R. I. C. Bradford, R. W. W. Brown, P. L. Candler, D. M. Carding, R. D. Caton, A. G. H. Clay, M. J. Clow, E. Cronin, A. J. Daly, T. A. W. Edwards, W. B. Evans, D. Foskett, A. C. F. Green, J. E. Hardwick-Smith, R. D. Hearn, J. S. Heller, J. P. Henry, L. R. Holt, G. N. Hunt, T. G. S. James, R. M. Johnstone, P. A. Knill Jones, J. Laughlin, R. B. Leech, G. B. Leyton, G. M. Little, A. G. McPherson, A. G. Marshall, A. H. Masina, T. K. Maurice, J. A. R. Miles, W. A. M. Miller, P. L. Mollison, W. E. D. Moore, J. Murray, R. O. Murray, A. P. Norman, G. Oppenheimer, W. E. Owens, R. Piper, J. G. B. Platts, J. S. Pratt, B. H. Price, J. S. Prichard, S. R. Reynolds, *E. L. N. Rhodes, J. H. B. Round, J. Smith, P. M. Smythe, H. Stott, A. M. Thomas, A. J. Walton, J. M. Wedderspoon, H. F. Whalley, C. F. H. Wiessner, W. W. Wiggins-Davies, M. M. Wilson, R. R. Wilson, B. J. O. Winfield, J. W. Wood, P. J. Wormald, G. M. Wright, D. E. Yarrow, M. D. Young, and J. Yudkin.

* Pathology and pharmacology only.

Dr. R. A. McCance, who has recently been appointed university reader in medicine, has been elected to a fellowship at Sidney Sussex College.

Society of Apothecaries of London

At recent examinations the following candidates were successful:—

Surgery.—M. Becker, Royal Colleges, Edin.; P. H. Davies, Univ. of Manch.; R. E. D. Ellis, Univ. of Leeds and West London Hosp.; R. P. Parkinson, London Hosp.; and T. G. Vilgoen, Guy's Hosp.

Medicine.—J. Brewis, St. Bart.'s Hosp.; I. J. Mathias, Guy's Hosp.; and O. Rochlin, London Hosp.

Forensic Medicine.—I. J. Mathias, Guy's Hosp.; and O. Rochlin, London Hosp.

Midwifery.—E. M. E. Decottignies, King's Coll. Hosp.; R. E. D. Ellis, Univ. of Leeds and West London Hosp.; H. Francis, London Hosp.; N. A. Jevons and D. Macpherson, Westminster Hosp.; J. R. Rose, Charing Cross Hosp.; R. Rowlandson, Univ. of Camb. and Guy's Hosp.; and H. Woolwich, Univ. of Liverp.

O. Rochlin, having completed the final examination, is granted the diploma of the society entitling him to practise medicine, surgery, and midwifery.

Order of St. John of Jerusalem

The following promotions in and appointments to the Venerable Order of the Hospital of St. John of Jerusalem have been sanctioned by the King:—

As Knight.—Major Andrew Woodroffe Anderson, M.B., and Major William Owen Evans, M.B.E., L.R.C.P.E.

As Commander.—Douglas William Anderson Bull, M.D., and Christopher Armstrong, M.B.

As Officer.—Lionel Langford Westrope, M.D., Hugh Riddell, M.B., Edward Herrick Knowles, L.R.C.P.E., Harry Banks, F.R.C.S., Andrew Paton Martin, M.B., Joseph Vaillancourt, M.D., Lt.-Col. Frederick Armstrong Young, M.D., Maj.-Gen. Percy Strickland Mills, C.I.E., I.M.S., William Traill Thomson, M.R.C.S., Clement Armour Verco, M.B., Walter Guy Shellshear, M.B., Col. John Livingston Hamilton, M.C., T.D., M.D., Kenneth Samuel Maurice-Smith, M.R.C.S., Lt.-Col. Cuthbert Lindsay Dunn, C.I.E., I.M.S. (retd.), James Knowles Milligan, M.R.C.S., Alexander Taylor McKay, M.D., Evan Lewys-Lloyd, M.R.C.S., the Hon. Peter Paul Debono, F.R.C.S., Prof. Joseph Ellul, M.D., and Edward Lloyd Davenport Parry, M.B.

Royal Visit to France

The following telegram has been received by the secretary of the British Medical Association from Prof. M. Loeper, president of the Association Presse Médicale Française:—

Association Presse Médicale Française vous prie être auprès collègues presse anglaise interprête sentiments très cordiaux à occasion venue en France de leurs Majestés.

The following reply was dispatched:—

Colleagues of English medical press cordially reciprocate greetings from Association Presse Médicale Française on this happy occasion.

The Academy of Medicine has also sent a fraternal greeting to the Royal Society of Medicine and to the whole medical profession of the Empire on the occasion of the visit.

University of London

Sir Robert Pickard, F.R.S., has been re-elected vice-chancellor for the year 1938–39. Dr. A. M. H. Gray has been appointed deputy vice-chancellor for the same period.

Dr. J. D. Boyd has been appointed to the university chair of anatomy at the London Hospital medical college. Since 1937 he has been university lecturer in anatomy in the University of Cambridge.

Dr. Boyd, who is 30, graduated with honours in science at Queen's University, Belfast, in 1927, and three years later, after a distinguished career as a medical student, obtained his M.B. with honours. He had previously spent three months at the School of International Studies with a Zimmern international scholarship, and he was now able with a McGrath scholarship in clinical medicine to spend a year visiting medical schools in the United States. On his return to Belfast he held house appointments at the Royal Victoria Infirmary and in 1931 he was appointed demonstrator of anatomy at the Queen's University. The following year he took his M.Sc., and in 1934 he was awarded the gold medal for his M.D. thesis. The same year he was awarded a Rockefeller travelling fellowship, and in 1935 he went to Cambridge as demonstrator in anatomy in the university. Two years later he was appointed to his present post. His published work includes papers on the development of the upper lip and the human carotid body.

The degree of D.Sc. in anatomy has been conferred on Dr. Thomas Nicol, university professor at King's College.

University of Glasgow

On June 22nd the honorary degree of doctor of laws was conferred on Prof. Matthew Stewart.

Agricultural Research Council

Lord Radnor and Sir Joseph Barcroft, F.R.S., have been appointed members of this council in succession to Lord Richard Cavendish and Sir Gowland Hopkins, F.R.S., who are retiring. Sir Thomas Middleton, F.R.S., will succeed Lord Richard Cavendish as chairman of the council.

International Life Insurance Medical Congress

The next International Life Insurance Medical Congress will be held in Paris from May 18th to 21st next year. The subjects for discussion will include tuberculosis, hyperthyroidism, obesity, tobacco, and albuminuria in their relation to life assurance. Further information may be had from Dr. P.-A. Carrié, 8, rue de Belloy, Paris XVI.

University College Hospital

Applications for the following scholarships should be sent to the medical school by July 11th and 12th respectively.

The *John Marshall fellowship* is tenable at the school for two years in the first instance and carries with it a salary of £500 per annum. The fellow is responsible for the surgical pathology in the hospital. Applications should be sent to the secretary.

The *Radcliffe Crocker travelling scholarship in dermatology* is worth about £280 and is tenable for a year, which must be spent at some place of study outside the United Kingdom. Further information will be found in our advertisement columns.

House Appointments at L.C.C. Hospitals

House physicians and house surgeons in the hospitals service of the London County Council are appointed in the first instance for six months, but provided that not more than twelve months are spent in one hospital they may extend their engagement by further periods of six months up to two years. It has been recommended that this regulation should now be altered so that the maximum period of two years may all be spent at the same hospital provided the duties are substantially changed during the second year. This change will also apply to clinical assistants.

Post-graduate Lectures in Edinburgh

During the summer vacation five Honyman Gillespie lectures will be given at the Royal Infirmary, Edinburgh. On July 21st Prof. C. G. Lambie (Sydney) will speak on the thyrotropic hormone and its relation to clinical syndromes; on August 18th Prof. A. J. Clark on therapeutic actions of barbiturates; on August 25th Prof. Charles McNeil on some clinical problems in pneumonia in children; on Sept. 1st Dr. H. M. Traquair on the field of vision and the anatomy of the visual nerve path; and on Sept. 8th Sir John Fraser on the pathology and end-results of treatment in carcinoma of the breast. The first lecture is at 5 P.M. and all the others are at 4.30 P.M. They are open to all graduates.

Institute of Child Psychology

The new premises of the children's centre of the institute at 6, Pembridge-villas, London, W., were opened by the Marchioness of Carisbrooke on June 23rd. She afterwards inspected the building and took a special interest in the play therapy rooms, particularly in those rooms where children could play with water and messy materials to their hearts' content. Mr. Kenneth Lindsay, parliamentary secretary to the Board of Education, said that official education was coming to recognise and be interested in the fact that there were different kinds of children for whom special provision must be made. He instanced the special categories already provided for and looked forward to the moment when provision could be made for nervous and neurotic children to receive such help as they needed. He heartily endorsed the work of the institute. Dr. Margaret Lowenfeld emphasised the importance of having a children's centre at the institute to which mothers could bring children they were troubled about and where a differential diagnosis could be carried out by experts. The varying activities of the institute and its relationship to other agencies were touched upon by Dr. Ethel Dukes who also spoke of the environmental influences activating the many difficulties from which the children suffered.

Iraqi Decoration

The King has given Prof. E. A. Mills permission to wear the insignia of the fourth class (civil division) of the Order of Al Rafidain, which has been conferred upon him by the King of Iraq in recognition of his services as director of the vaccine and lymph institute at the Iraqi Directorate-General of Health.

Middlesbrough Hospital Scheme

A provisional agreement has been reached by representatives of the North Ormesby Hospital and the North Riding Infirmary and the corporation which will be put into operation for a six months' test. The scheme will enable contributors to the North Ormesby Hospital and the North Riding Infirmary to obtain treatment in the municipal hospital if accommodation is not available in the others.

Princess Mary's Convalescent Home, Margate

This hospital, which was formerly a children's hospital, has been reconstructed so that convalescent women who have hitherto been accommodated at St. Benedict's Hospital, Tooting, may be sent to the seaside. Certain existing buildings have been remodelled and four single-story blocks have been demolished to provide a site for a new dormitory block. The total accommodation of the new convalescent home is 223 beds and 14 cots for babies accompanying their mothers. A massage treatment unit is provided. Three staircases and a passenger lift serve all floors, and flat roofs with parapet walls on the two wings provide open-air facilities, while there are uncovered balconies on the southern side. A single-story block has been adapted as a recreation-room, 20 ft. wide and 73 ft. long, with a removable stage, two dressing-rooms, and a scenery-room. New gardens have been made and the existing gardens remodelled, with a pleasant view over Dane Park, and advantage has been taken of the natural slope of the ground to provide built-up rockeries backed by flower beds. The home was taken into use on June 10th and on view to visitors on June 24th. Patients will be sent to the home on the recommendation of the medical superintendents of the Council's London hospitals. The patients will stay for about three weeks and during this period their treatment will be continued. The medical superintendent is Dr. J. O. Reid.

Medical Diary

July 4th to July 10th

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1 Wimpole-street, W.

TUESDAY.—5 P.M., annual meeting.

ROYAL MEDICO-PSYCHOLOGICAL ASSOCIATION.

WEDNESDAY.—10 A.M. (King's Hall, Ilkley), annual general meeting. 2.30 P.M. (at Scalebor Park, Burley-in-Wharvedale), Dr. J. R. Gilmour: The Private Patient and Some Changes. (Presidential address.)

THURSDAY.—9.45 A.M. (at the King's Hall), Dr. R. Gjessing (Oslo), Mr. J. H. Quastel, D.Sc., and Dr. W. T. H. Wales: The Physiopathology of Schizophrenia. Dr. G. W. B. James: Insulin and Cardiazol Treatments (cinema film). Dr. A. Walk and Dr. W. Mayer-Gross: Convulsive Therapy with Triazol.

FRIDAY.—9.45 A.M., Dr. M. Sakel (Vienna), Dr. L. C. Cook, Dr. E. Larkin, Dr. L. W. Russell, Dr. A. Dick and Dr. W. McAdam, Dr. L. A. Finiefs, and Dr. I. G. H. Wilson: Physiotherapy of Schizophrenia with special reference to Insulin Hypoglycæmia and Convulsive Therapy. 2.30 P.M., Dr. L. S. Penrose: Genetical Problems in Mental Deficiency. Dr. T. A. Munro: Consanguinity and Mental Disorder.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

OXFORD OPHTHALMOLOGICAL CONGRESS.

THURSDAY.—10 A.M. (Department of Human Anatomy, University Museum), Prof. Hugh Cairns, and Dr. Bernard Chavasse: Ocular Palsies, their Ætiology, Diagnosis, and Treatment. Mr. F. A. Williamson-Noble: Contact Glasses. 2.30 P.M., Dr. J. A. van Heuven (Utrecht): Papilledema. Dr. Czukrász Ida (Debrecen): Hungarian Plastic Methods.

FRIDAY.—10 A.M., Mr. Harrison Butler: Capsular Glaucoma. Mr. Frederick Ridley: An "Active" Substance in the Tears. Prof. A. von Szily (Münster): Problems of Cataract. (Doyne lecture.) 2.30 P.M., Prof. Hans Lauber (Warsaw): Relationship between Intracranial and Retinal Blood

Pressure and Intra-ocular Tension; the Treatment of Tabetic Optic Atrophy. Dr. H. M. Traquair: Anæsthetics in Ophthalmic Surgery. Mr. J. Cole Marshall: Operation for Detachment of the Retina (cinema film).

SATURDAY.—10 A.M., Mr. P. H. Adams: Temporary Alteration in Refraction due to Eyelid Tumours. Dr. Bernard Samuels (New York): Anatomical Changes in Globes with Primary Detachment of the Retina. Dr. Robert Buxton: The Intracapsular Extraction of Cataract with Forceps.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C.

THURSDAY.—2 P.M., Dr. Bertram Shires: Radiographic Diagnosis with Lipiodol and other Opaque Substance. 3 P.M., a demonstration of electrical testing of muscles in the electrotherapy department.

Out-patient clinics, daily at 10 A.M. and ward visits at 2 P.M.

ST. GEORGE'S HOSPITAL, S.W.

MONDAY.—5 P.M., Sir Frederick Hobday: Comparative Medicine.

THURSDAY.—5 P.M., Dr. Anthony Feiling: neurological demonstration.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.

MONDAY to SUNDAY.—ST. MARK'S HOSPITAL, City-road, E.C., all-day course in proctology.—DEVONSHIRE ROYAL HOSPITAL, BUXTON, Sat. and Sun., course in rheumatic disorders and applied hydrology.

SOUTH-WEST LONDON POST-GRADUATE ASSOCIATION.

WEDNESDAY.—4 P.M. (St. James' Hospital, Ouseley-road, S.W.), Dr. C. E. Lakin: demonstration of medical cases.

BRITISH POSTGRADUATE MEDICAL SCHOOL, Ducane-road, W.

MONDAY.—4.30 P.M., Dr. E. Sharpey-Schafer: Diseases of the Ductless Glands.

TUESDAY.—4.30 P.M. (at North-Western Hospital), Dr. R. Cruickshank: Modern Laboratory Methods in Diagnosis and Control of Acute Infectious Diseases.

WEDNESDAY.—Noon, clinical and pathological conference (medical). 3 P.M., clinical and pathological conference (surgical).

THURSDAY.—2.15 P.M., Dr. Duncan White: radiological demonstration.

FRIDAY.—2 P.M., clinical and pathological conference (obstetrics and gynæcology). 2.30 P.M., Mr. Rock Carling: Surgery of the Spleen.

Daily, 10 A.M. to 4 P.M., medical clinics, surgical clinics and operations, obstetrical and gynæcological clinics and operations.

Appointments

ALKAN, SENTA, M.B. Brist., Medical Officer at the Winford Orthopædic Hospital, Bristol.

BABBAGE, N. F., F.R.C.S., Senior Resident Surgical Officer at the Connaught Hospital, Walthamstow.

BAKEWELL, BEATRIX H., M.B. N.Z., D.P.H., Assistant Maternity and Child Welfare Medical Officer for Lewisham.

BROCKINGTON, C. F., M.D. Camb., D.P.H., Barrister-at-law (Middle Temple), Deputy County Medical Officer of Health and Deputy School Medical Officer for Warwickshire.

CAMERON, J. A. MAXWELL, M.D. Manch., F.R.C.S. Edin., Resident Surgical Officer at the Royal Infirmary, Halifax.

CHESTER, A. W., M.B. Durh., Junior Resident Medical Officer at the City of London Maternity Hospital.

GOLDSMITH, A. J. B., M.B. Lond., F.R.C.S. Eng., Pathologist and Curator at the Royal London Ophthalmic Hospital (Moorfields).

HADLEY, G. D., M.B., M.R.C.P. Lond., Medical First Assistant and Registrar at the London Hospital.

HESLOP, J. FIRTH, M.B. Manch., F.R.C.S. Eng., Chief Assistant to the Neuro-surgical Department of the Manchester Royal Infirmary.

JONES, I. J., M.B. Lond., D.P.H., Medical Officer of Health for Montgomeryshire.

KENTON, COLMAN, M.R.C.S. Eng., Assistant Medical Officer at the County Mental Hospital, Rainhill, Lancs.

MCMAHON, R. J. H., M.R.C.S. Eng., Second Resident Medical Officer at the Alexandra Hospital, Swanley.

*MCMATH, W. F. T., M.D. Belf., M.R.C.P. Lond., D.P.H., Medical Officer of Health and School Medical Officer for Batley.

MACNAB, G. H., M.B. Edin., F.R.C.S. Eng., Surgeon to the Infants Hospital, Westminster.

MADDISON, JOHN, M.D. Durh., D.P.H., Medical Officer of Health for Twickenham.

MARTIN, D. J., M.B. Lond., F.R.C.S. Edin., Hon. Surgeon to the Royal East Sussex Hospital, Hastings.

MASCARI, A. J., L.M.S. Nova Scotia, Assistant Surgical Officer at the Bolton Royal Infirmary.

MEADOWS, SWITHIN, M.D., M.R.C.P. Lond., Hon. Neurologist to the King Edward VII Hospital, Windsor.

* Dr. G. H. Pearce remains Medical Officer of Health for Heckmondwike U.D.

MORGAN, M. T., M.D. Liverp., D.P.H., Medical Officer of Health for the Port of London.

SAVAGE, THOMAS, M.R.C.S. Eng., Senior Resident Medical Officer at the City of London Maternity Hospital.

SHANKLAND, P. MACFARLANE, L.R.C.P. Lond., L.M., Assistant Medical Officer at the Out-patient Department of the Royal Manchester Children's Hospital.

TOOLEY, P. H., M.B. Lond., Assistant Medical Officer at the County Mental Hospital, Rainhill, Lancs.

WILSON, W. C. MACCULLAGH, M.D. Belf., D.P.H., Assistant Pathologist at the Coventry Joint Pathological Laboratory.

YOUNG, J. BRUCE, M.D. Edin., M.R.C.P. Lond., Hon. Consulting Physician to the Wilson Hospital, Mitcham, Surrey.

London County Council Hospital Staff.—The following appointments are announced. A.M.O. (I) or (II) = Assistant Medical Officer, Grade I or II:—

GILBEY, A. L., M.B. Edin., M.C.O.G., A.M.O. (I), St. Giles';
PRENDIVILLE, J. T., M.B. N.U.I., A.M.O. (II), Grove Park;
FRIEDLANDER, DAVID, M.B. Cape Town, L.M., A.M.O. (II), St. Alfege's;
CRAIG, N. J., M.B. Aberd., A.M.O. (II), St. George-in-the-East;
PETERS, E. S., M.B. Melb., A.M.O. (II), St. Luke's, Chelsea;
FRASER, H. S., M.B. Aberd., A.M.O. (II), Grove Park;
TAYLOR, A. W., M.R.C.S. Eng., Clinical Assistant, St. Mary Abbots;
MAXWELL, R. J. C., M.Ch. Belf., F.R.C.S. Eng., A.M.O. (I), King George V Sanatorium;
STEPHEN, J. L., M.B. Aberd., F.R.C.S. Edin., A.M.O. (I), St. Giles';
RICHARDS, W. F., M.B. Camb., M.R.C.P. Lond., A.M.O. (I), Grove Park;
BREEN, G. E., M.D. N.U.I., D.P.H., D.O.M.S., Senior A.M.O. (I), Brook; and
HAMILTON, MAX, M.B. Lond., A.M.O. (II), Archway.

Vacancies

For further information refer to the advertisement columns.

Aberdeen Royal Infirmary.—Surg. Reg., £200.
Aberdeen University.—Lectureship in Anatomy, £450.
Ashton-under-Lyne District Infirmary.—Res. Surg. O., Cas. H.S., and H.S., at rate of £200, £180, and £150 respectively.
Ashton-under-Lyne, Lake Hosp. and Darnton House Institution.—Sen. Res. M.O., at rate of £300.
Aylesbury, Royal Buckinghamshire Hosp.—Jun. Res. M.O., at rate of £150.
Bangor, Caernarvonshire and Anglesey Infirmary.—Sen. H.S., £170. Also Cas. O., at rate of £150.
Bath, Royal United Hosp.—Hon. Asst. Dermatologist. Hon. Physician for Mental Diseases. Also Hon. Med. Reg.
Birmingham, City Mental Hosp.—Med. Supt., Winson Green Division, £1100.
Birmingham, Dudley Road Hosp.—Jun. M.O., at rate of £200.
Birmingham and Midland Eye Hosp.—H.S., at rate of £130.
Birmingham City, Maternity and Child Welfare Dept.—Two M.O.'s, each £500.
Bolingbroke Hosp., Wandsworth Common, S.W.—H.P., at rate of £120.
Bootle General Hosp.—H.P., two H.S.'s. Also Cas. O., each at rate of £150.
Bradford Royal Infirmary.—Res. Surg. O., £250. Also Asst. Radium Officer, £175.
Brighton, New Sussex Hosp. for Women.—H.P., at rate of £100.
Brighton, Sussex Maternity and Women's Hosp.—Hon. Obstet. and Gynæcological Surgeon.
Bristol Royal Infirmary.—Sen. Cas. H.S. and Sen. Obstet. H.S., at rate of £150 and £100 respectively. Also H.P.'s and H.S.'s, each at rate of £80.
Bristol University.—Temp. Asst. Bacteriologist in Dept. of Preventive Medicine, £300.
British Postgraduate Medical School, Ducane-road, W.—Gynæcological H.S., £105.
Burton-on-Trent General Infirmary.—Cas. O. and H.P., £150.
Buxton, Derbyshire, Devonshire Royal Hosp.—H.P., at rate of £150.
Cambridge, Addenbrooke's Hosp.—H.S. and H.P., each at rate of £130.
Canterbury, Kent and Canterbury Hosp.—H.P., at rate of £125.
Cheshire, Bredbury and Romiley Urban District Council, &c.—M.O.H., £800.
Chester City Hosp.—Jun. Res. M.O., at rate of £150.
Chesterfield and North Derbyshire Royal Hosp.—H.S. to Ophth., &c., Dept., at rate of £150.
Connaught Hosp., Walthamstow, E.—Cas. O., at rate of £110.
Dewsbury and District General Infirmary.—Sen. H.S. and Second H.S., £200 and £150 respectively.
Doncaster Royal Infirmary.—H.S. to Eye and Ear, Nose, and Throat Dept., £150.
Durham County and Sunderland Eye Infirmary.—H.S., £350.
East Ham Memorial Hosp., Shrewsbury-road, E.—Hon. Gynæcologist.
Glasgow, Hawkhead Mental Hosp.—Jun. Asst. M.O., £300.
Gloucester, Barwood House Hosp., &c.—Second Asst. M.O., £500.
Gloucestershire Royal Infirmary and Eye Institution.—Res. Surg. O., £200.
Gordon Hosp. for Diseases of the Rectum and Colon, Vincent-square, S.W.—Surg. Reg.
Guildford, Royal Surrey County Hosp.—H.S., at rate of £150.
Hampstead General Hosp., Haverstock-hill, N.W.—H.P. and H.S., each at rate of £100. Also Surg. to Out-patients.

Hastings, Royal East Sussex Hosp.—Hon. Jun. Surgeon.
Herefordshire General Hosp.—Res. Surg. O. and H.P., £150 and £100 respectively.
Hosp. for Consumption and Diseases of the Chest, Brompton, S.W.—H.P., at rate of £50.
Hosp. for Tropical Diseases, Gordon-street, W.C.—H.P., at rate of £120.
Hove General Hosp.—Hon. Gynæcological Surgeon.
Huddersfield Royal Infirmary.—H.P., at rate of £150.
Hull, Beverley-road Institution.—Asst. M.O., £350.
Indian Medical Service.—Commissions.
Khartoum, Stack Medical Research Laboratories.—Jun. Lab. Asst., £E.324.
Lancashire Mental Deficiency Acts Committee.—Additional Asst. M.O., £600.
Leeds Public Dispensary and Hosp.—H.P., at rate of £150.
Liverpool City Infectious Diseases Hosps.—Asst. Res. M.O., £250.
Liverpool Royal Children's Hosp.—Res. Cas O., at rate of £250. Res. M.O. and Res. Surg. O., each at rate of £120. Also two Res. H.P.'s and two Res. H.S.'s, each at rate of £100.
Liverpool Sanatorium, Delamere Forest.—Asst. to Med. Supt., £225.
London County Council.—Asst. M.O.'s, Grades I and II, £350 and £250 respectively. Also Part-time Ear, Nose, and Throat Specialist, £125, &c.
London Hosp., E.—Medical First Asst. and Reg., £300. Also Medical Out-patients' First Asst., £150.
London Jewish Hosp., Stepney Green, E.—Hon. Asst. Surgeon to Ear, Nose, and Throat Dept.
London Skin Hosp., 40, Fitzroy-square, W.—Hon. Physician.
Manchester, Booth Hall Hosp.—Res. Asst. M.O., at rate of £200.
Manchester, Crumpsall Hosp.—Res. Surg. O., £400.
Manchester, Northern Hosp., Cheetham Hill-road.—Res. Surg. O., £150. Also Res. H.P. and Res. H.S., each at rate of £100.
Manchester Royal Children's Hosp.—Res. H.S., at rate of £100.
Mountain Ash Urban District Council, &c., Education Committee. Asst. M.O., &c., £500.
National Temperance Hosp., Hampstead-road, N.W.—H.P., at rate of £100.
New Zealand Royal Society for the Health of Women and Children. Medical Adviser to Dominion Council, £1200.
Newcastle-upon-Tyne, City and County.—Asst. Child Welfare M.O., £500.
North Middlesex County Hosp., Silver-street, N.—Asst. M.O. at rate of £350.
Northamptonshire County Council.—Asst. County M.O., &c., £800.
Norwich, Norfolk and Norwich Hosp.—H.S., £120.
Nottingham, Mapperley Hosp.—Locum Tenens M.O., 7 guineas weekly.
Oldham Royal Infirmary.—Sen. H.S., at rate of £250–£300.
Penshurst, Kent, Cassel Hosp. for Functional Nervous Disorders. Locum Tenens, 8 guineas weekly.
Portsmouth, St. Mary's Municipal Hosp.—Sen. and Jun. Asst. Res. M.O., £350 and £250 respectively.
Preston, Whiston County Hosp., near Prescot.—Res. M.O., at rate of £350.
Queen Mary's Hosp. for the East End, Stratford, E.—Cas. and Out-patient O., at rate of £150.
Queen's Hosp. for Children, Hackney-road, E.—Vacancy in Dept. of Psychological Medicine, 1 guinea per session.
Radium Institute, Riding House-street, W.—Res. M.O., at rate of £250.
Reading, Royal Berkshire Hosp.—Res. Anæsthetist and Cas. O., at rate of £250 and £150 respectively.
Redhill County Hosp.—Res. Asst. M.O., at rate of £250.
Richmond, Surrey, Grove-road Institution.—Res. Asst. M.O., at rate of £250.
Rochdale Infirmary and Dispensary.—Second H.S., £150.
Rotherham Hosp.—Cas. H.S., £150.
Royal National Orthopædic Hosp., 234, Great Portland-street, W.—Two H.S.'s, each at rate of £150.
Royal Naval Medical Service.—M.O.'s.
Royal Northern Hosp., Holloway, N.—H.P. and Obstet. H.S., each at rate of £70.
Royal Waterloo Hosp. for Children and Women, Waterloo-road, S.E.—Hon. Asst. Physician.
St. George's Hosp., S.W.—H.S. to Ear, Nose, and Throat and Ophth. Depts., at rate of £40.
St. Helens County Borough.—Asst. M.O.H., £500.
St. Mary's Hosp., W.—Cas. H.S., at rate of £100.
St. Mary's Hosp. for Women and Children, Plaistow, E.—Res. Surg. O., at rate of £155.
St. Pancras Dispensary, 39, Oakley-square, N.W.—Hon. Gynæcologist, 1½ guineas per session.
St. Peter's Hosp. for Stone, &c., Henrietta-street, W.C.—H.S., at rate of £75.
Salop County Council.—Deputy County M.O.H. and Asst. M.O.H., £700 and £600 respectively.
Sheffield Royal Hosp.—Clin. Asst., £300.
Sheffield Royal Infirmary.—Clin. Asst. to Ophth. Dept., £300.
Somerset County.—M.O.H. for Urban Districts of Frome, &c., £800.
South London Hosp. for Women, Clapham Common, S.W.—H.S., at rate of £100.
Southampton County Borough.—Asst. School Dentist, £450.
Southampton, Royal South Hants and Southampton Hosp.—Res. Anæsthetist. Also Cas. O., each at rate of £150.
Southend-on-Sea General Hosp.—Res. Anæsthetist and First H.S., at rate of £125 and £100 respectively.
Staffordshire General Infirmary.—H.S., £175.
Sunderland Royal Infirmary.—Cas. O. and H.S. to Ear, Nose, and Throat Dept., H.P., and H.S., each at rate of £120.
Tunbridge Wells, Kent and Sussex Hosp.—H.S. and Cas. O., £150.
University College Hosp. Medical School.—Radcliffe Crocker Travelling Scholarship in Dermatology, £280.
Warlingham Park Hosp., Warlingham, Surrey.—Jun. Asst. M.O., £400.
West Bromwich, Hallam Hosp.—Res. Obstet. Officer, £300. Also Res. Asst. M.O., at rate of £200.
West End Hosp. for Nervous Diseases, Gloucester-gate, N.W.—Res. H.P., £125.
West Sussex County Council.—Asst. County M.O.H., &c., £800.
Westminster City.—Asst. M.O., £600.
Wolverhampton Royal Hosp.—H.S., at rate of £100.
Worcester Royal Infirmary.—H.P., Cas. H.S., and Second H.S., £150, £140, and £120 respectively.
York County Hosp.—Hon. Surgeon to Ear, Nose, and Throat Dept.
York Dispensary.—Two Res. M.O.'s, each £200.
York, The Retreat.—Med. Supt., £1000.

Medical Referee under the Workmen's Compensation Act, 1925, for the Ayr Sheriff Court District (Sheriffdom of Ayr). Applications should be addressed to the Private Secretary, Scottish Office, Whitehall, London, S.W.1, before July 19th. Also for the Pontypool part of the Pontypool and Blaenavon County Court District and the Chepstow and Newport County Court Districts (Circuit No. 24). Applications to the Private Secretary, Home Office, Whitehall, London, S.W.1, before July 22nd.

Births, Marriages, and Deaths

BIRTHS

COLEMAN.—On June 20th, at Croydon, the wife of Dr. A. Coleman—a daughter.

COOKE.—On June 26th, at Oxford, the wife of Dr. Alexander Cooke—a daughter.

COYLE.—On June 22nd, at Vanbrugh Park, Blackheath, the wife of Dr. Cecil D. Coyle—a son.

DONOVAN.—On June 24th, at Edgbaston, Birmingham, the wife of Hugh Donovan, F.R.C.S.—a son.

HANDFIELD-JONES.—On June 24th, at Queen Anne-street, W., the wife of R. M. Handfield-Jones, F.R.C.S.—a son.

KEMBLE.—On June 20th, at Devonshire-place, W., the wife of James Kemble, F.R.C.S., Harley House—a son.

MOORE.—On June 27th, at Beckenham, the wife of Dr. J. K. Moore—a son.

PATTON.—On June 24th, at Carlisle, the wife of Dr. A. W. Patton—a daughter.

RATCLIFFE.—On June 26th, at Birnam Lodge, Radcliffe-on-Trent, to Norah (née Greenall) wife of Dr. T. A. Ratcliffe—a daughter.

MARRIAGES

BEVAN—FREEMAN.—On June 22nd, at Holy Trinity, Brompton, S.W., Roger Bevan, B.M., to Diana Freeman.

MORE NISBETT—MONTGOMERY.—On June 24th, at Chelsea Old Church, Surgeon Lieut. John Graham More Nisbett, R.N., to Sheila Gwendolen Montgomery.

NEVILLE—BELL.—On June 22nd, at Christ Church, Purley, Richard Charles Neville, M.B., to Margaret Marian Bell.

GOLDEN WEDDING

TROWER—HALL SAY.—On June 27th, 1888, at S. Mary-at-Hill, London, Arthur Trower, M.R.C.S. Eng., to Hilda Lilian Hall Say. Present address: 25, Brittany-road, St. Leonards-on-Sea.

DEATHS

BLACKMORE.—On June 25th, at East Sheen, Stuart Blackmore, O.B.E., M.R.C.S., Major, R.A.M.C. (retd.).

HERON.—On June 28th, in London, James Mathews Heron, M.D. Dubl., J.P., aged 71.

HIRD.—On June 27th, at Edgbaston, Alfred Ernest Wilson Hird, M.R.C.S., late Surg. Capt., R.N.V.R., in his 58th year.

JEFFREE.—On June 28th, at Mersthan, Surrey, Frank Jeffree, M.D. Durh., Major, R.A.M.C. (T.) (retd.), aged 75.

MILLER.—On June 27th, at Preston, Lancs, Thomas Henry Miller, M.B. Vict., L.D.S., aged 65.

PAULL.—On June 14th, at Bridgefield, Farnham, William Kirman Paull, L.R.C.P. Edin., L.S.A., Major, R.A.M.C. (T.), (retd.).

PERCEVAL.—On June 20th, Frank Perceval, M.R.C.S. Eng., formerly of Whittingham and Prestwich.

RICH.—On June 23rd, Harold Strathfield Rich, M.R.C.S. Eng., of Queen Anne-street, W.

STIRLING.—On June 25th, at Burgess Hill, Robert Johnstone Stirling, L.R.C.P., Major, R.A.M.C. (retd.).

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

CONVALESCENCE FROM TUBERCULOSIS.—We have received an inquiry for a convalescent home, or a private family, where a young refugee (aged 22, male, art historian) could go for three or four months. He is convalescent from tuberculosis and has a pneumothorax; there are no tubercle bacilli in the sputum. He could pay £2 weekly and is now in the Isle of Wight.

NOTES, COMMENTS, AND ABSTRACTS

INTERNATIONAL RED CROSS CONFERENCE

THE business before this congress, which was held in London from June 20th to 25th, was first considered by four separate commissions, and the resolutions passed in commission were approved with little discussion by the full conference. They dealt mostly with matters of principle.

In the report of the first commission, submitted by Miss Norah Hill (India), the delegates were requested to ask their governments to examine the means by which they might raise the funds available for the International Red Cross Committee to at least 3 million Swiss francs. The commission pointed out the value to all nations of a strictly neutral and impartial body and also the necessity for a regular income, independent of occasional contributions, to enable the committee to carry out its work, especially in wartime. Another resolution, after drawing attention to the strict economy practised in administration, urged national societies to support not only the International Red Cross Committee but the League of Red Cross Societies; this resolution was passed, the delegate from Italy asking that their abstention from voting should be recorded. In the discussion by the commission Italy had also been opposed to a resolution that no Red Cross delegation, section, or committee should be established in foreign territory without the consent of the central committee of the national society of that country. The resolution was however eventually carried unanimously.

RESTRICTION OF BOMBING FROM THE AIR

The proposal giving rise to most dissension was one originally put forward by Mr. Norman Davis of the United States concerning sanctuaries from aerial attack. In its original form it was opposed by Ecuador, Chile, Italy, and Germany and supported by France, China, and Great Britain, but after two hours a modification put forward by Germany was accepted by the commission and passed unanimously by the conference. Its terms embodied an appeal in the name of humanity from the fifty-four national Red Cross societies represented to the competent authorities in all countries "to prevent or so restrict bombing from the air as to safeguard the lives of helpless women and children and aged civilians," and urged those authorities "in all areas where civilian lives are liable to be endangered by any military operation, to arrange for the evacuation of women and children into zones of immunity under Red Cross protection." The hope was expressed that steps would be taken without delay to secure agreements between all governments to that end. A special committee is to be set up for the study of the possibilities of coöperation between Red Cross societies in wartime.

SUGGESTED MODIFICATION OF GENEVA CONVENTION

It had been suggested that the Geneva Convention might be modified to cover war by land, sea, and air with one code of laws. The second (legal) commission (rapporteur, Mr. Camille Gorgé of Switzerland) considered however that the number of points in the convention which needed modification were few, and as several delegations recommended that the protection of civil populations should be dealt with as a whole in a separate convention it was decided that the proposed modifications might be embodied in a protocol annexed to the Geneva convention at a meeting of a diplomatic conference in the near future.

HOSPITAL TOWNS AND HOSPITAL AREAS

The hope was expressed that the International Red Cross Committee would be able to call together a commission of military experts and experts in international law to draw up a draft concerning the provision of hospital towns and areas; the draft would then be submitted to a diplomatic conference for consideration. It was felt that the creation of such areas could not weaken the protection resulting from the rules of international law as a whole. In the meantime governments could with advantage consider the question of concluding mutual agreements for the provision of such areas. As satisfactory results have been obtained during a recent conflict by the creation of an area of immunity for the civil population, the conference asked the committee to call the attention of governments to this point whenever it would be expedient to do so. The function of the Red Cross in time of civil war was also considered. Representatives were present at the Conference from the Red Cross organisations of both the Government of Spain and of the insurgents. Early in the proceedings the former had challenged the right of the latter to be present; that both sides were welcome was emphasised by Sir Arthur Stanley, the chairman of the Conference. In its resolutions referring to civil war the Conference confined itself to mentioning the high humanitarian principles of the Red Cross and their application and to requesting the International Red Cross Committee to study the problems encountered.

NURSING, TRANSPORT, AND FIRST-AID SERVICES

The third commission (rapporteur, Dr. Daniel de Carvallho) recommended the national societies to be ready at all times with a plan of action to be followed in time of war or calamity. The training of Red Cross nurses and voluntary aids should be completed and a sufficient personnel (including reliefs) should be enrolled to deal with the victims of aerial attacks. Materials for relief suitable for any emergency should be to hand and an adaptable transport service should be organised which would include provision for aerial relief.

A resolution was also passed recommending the development of first-aid services on highways on a standardised plan; in order to prevent accidents the Red Cross is to teach children the rules of the road and first aid through the Junior Red Cross. The national and international societies are to attempt to make arrangements with flying clubs, government and private services, and international organisations to ensure their collaboration in relief work. The International Red Cross Committee and the League are to study the possibility of drawing up the necessary rules and regulations to allow aerial relief transports to cross frontiers as easily as possible in peace time. Other resolutions presented by the third commission concerned coöperation with the International Relief Union.

VOLUNTARY AID DETACHMENTS

The report of the fourth commission was presented by Miss Mabel T. Boardman, secretary of the American National Red Cross. It mentioned the initiative

taken by the Polish Red Cross with a view to conferring the Nobel Peace prize on the League of Red Cross Societies for its assistance to the Junior Red Cross. Miss Boardman emphasised the importance of the training of voluntary aid detachments. Such training enabled those left behind in wartime to do something to help their men-folk and its development was one of the principal ways of fostering the spirit of the Red Cross in all social circles. The American Red Cross was especially congratulated on its activity, its personnel numbering over 8 million.

THE COMMERCE OF DRUGS

AN article in the *Times* of June 18th pointed out that London is no longer the world's clearing-house for vegetable drugs, and suggested (between the lines) that the lost trade will never be regained. The evidence of the loss is certainly complete, and the cause of it is clear. Before the late war 26 public auctions, each occupying five or six hours, were held yearly in Mincing-lane, and a large proportion of the goods catalogued was sold under the hammer. Since the war the number of auctions has been reduced to six a year and on the last occasion, the June auction, the proceedings were over in thirty-five minutes. For a long time past, indeed, the quantity of goods sold has been infinitesimal. Of the June auction the special correspondent of the *Times* says "it was as though a library of 1000 volumes had been put up to auction and only half a dozen pamphlets had been sold under the hammer"; and if this simile errs at all it is by an over-statement of the number of pamphlets sold.

What is the cause of this debacle? It is one of the many legacies of the war—the result of submarine warfare which compelled countries needing the goods produced by other countries to obtain them directly instead of through British traders. There is now no need for American buyers of Indian senna pods to come to London, for the produce of Tinnevelly goes direct to the United States. This is one example out of scores, and this direct traffic has superseded the old method to the avoidance of London and to the loss of drug importers and finance houses. Though Mincing-lane retains a portion of its former international trade in drugs, this is chiefly conducted by private treaty.

It must not of course be assumed from these changes that vegetable drugs have gone out of fashion. Immense quantities are imported for use by home manufacturing druggists and wholesale houses, as well as for the remnant of foreign buyers. Indeed there is no trade or statistical evidence that newer remedies have supplanted vegetable drugs or even diminished the volume of commerce in them.

PHYSICS IN EVERYDAY LIFE

ON the occasion of its annual inspection by the general board the National Physical Laboratory at Teddington is opened to visitors and special exhibits are arranged to demonstrate the work done and the advances made during the year. At this year's inspection on June 28th about 1500 scientific workers attended and were received in the great hall, which houses the million-volt electrical plant, by Sir William Bragg, chairman of the general board, Lord Rayleigh, chairman of the executive committee, and Prof. W. L. Bragg, the director of the laboratory.

The work of the laboratory covers a wide and ever-widening field, extending from the routine testing of taximeters to the larger problems of aircraft and ship design. To the medical visitor the physics department was of most immediate interest. Here the investigation of traffic and other noises is being carried out (see *Lancet*, 1937, **2**, 697). Motor-cycles, which are responsible for an appreciable proportion of road noises, are tested in a double-walled room in which the engine can be run with the silencer projecting through a hole in the wall, so that the analysing microphones can separate the clatter from the bangs. Inquiry is also being made into the silencing of aircraft and of the London tube trains, and the efficiency of air-raid warning devices. The structure of diseased and sound teeth is being investigated by photomicrographic and radiographic methods and exhibits were arranged to show the orientation of the constituent crystals which are accessible only to radiographic analysis. In one division of the physics department half a million clinical thermometers are tested every year, and in another radium is tested for the National Radium Trust and the hospitals. Among the more unexpected duties of the department is that of searching for radium which has been lost in used dressings or thrown away as rubbish, and this is done by means of a portable detector which emits a clucking noise when the radium is found.

REACTION TO NOISE

To some, noise is just one more tiresome accompaniment of civilisation, like poison-gas or the income-tax, to which it is possible to become comparatively inured or resigned. To others, noise is a menace to peace of mind, a dragon whose voice can be measured in decibels and fought with any available weapon. The *Architects' Journal* for May is almost entirely devoted to a consideration of the causes and cure of needless noise. As Lord Horder points out in a foreword, the problem can be attacked in two ways: either by inventing gadgets to douse noise that we make, or to prevent it at its source. The latter is by far the better method but it demands foresight and wise planning. There was a time, only thirty years ago, when this country was a quiet lake containing a few islands of noise. It could now fairly be described as a noisy lake containing a very few quiet islands. Three enemies of silence are arraigned in order of iniquity: (1) the internal combustion engine; (2) other forms of locomotion; and (3) machinery and mechanical equipment. Hitherto the aim of constructive inventors has been to produce time-saving or labour-saving devices; the next step should be to insist that the criteria of acceptance of any form of machinery should include comparatively silent action.

INSTEAD OF A FEE

Dr. JAMES PEARSE writes: Those of us who have read "Stories Told in 1937" will echo your statement as to its grim reading, and will hope that a wide response may be given in order that the necessity therein revealed may receive extended relief. May I make a suggestion? Many of us, either personally or on behalf of our families, have received timely aid from medical or surgical colleagues. We are saved much of the heavy expense which illness entails on others, owing to the spirit of fellowship which is shown by these; as one remarked to me, "Dog does not eat dog." It would be an apposite and helpful gesture to register our gratitude by assisting the Royal Medical Benevolent Fund.

THROAT SPRAYS

WE have received two throat and nose sprays of a new type manufactured by the Gardner Company, Ltd., of 7, Chapel-street, London, E.C.2. The first is of a simple pattern and sells at 2*s*. 6*d*. The second, which has a long nozzle for throat work, has an adjustable jet and shield by which it is possible to spray in any direction by simply turning the head. The shield is firmly attached so that there is no possibility of its slipping off when in use. Both are intended for use with light oils or watery solutions and are strongly made and well finished and can be sterilised by boiling if the rubber bulbs are removed.